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REVIEW OF THE GLOBAL ENVIRONMENT 10 YEARS AFTER STOCKHOLM

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HEARINGS

BEFORE THE

SUBCOMMITTEE ON HUMAN RIGHTS
AND INTERNATIONAL ORGANIZATIONS

OF THE

COMMITTEE ON FOREIGN AFFAIRS
HOUSE OF REPRESENTATIVES

NINETY-SEVENTH CONGRESS

SECOND SESSION

MARCH 30; APRIL 1 AND 20, 1982

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REVIEW OF THE GLOBAL ENVIRONMENT TEN YEARS AFTER STOCKHOLM

TUESDAY, MARCH 30, 1981

House of Representatives,
Committee on Foreign Affairs,
Subcommittee on Human Rights
and International Organizations,
Washington, D.C.

The subcommittee met at 10:05 a.m. in room 2200, Rayburn House Office Building, Hon. Don Bonker (chairman of the subcommittee) presiding.

Mr. **Bonker**. The subcommittee will come to order.

The Subcommittee on Human Rights and International Organizations will be conducting a series of three hearings on the subject of the global environment 10 years after Stockholm.

In 1908, President Theodore Roosevelt created the first Federal commission to study the state of the country's natural resources. The National Conservation Commission, headed by Gifford Pinchot, observed at its first meeting: "The Nation is in the position of a man, who, bequeathed a fortune, has gone on spending it recklessly, never taking the trouble to ask the amount of his inheritance, or how long it is likely to last."

The 1972 U.N.-sponsored Stockholm Conference on the Human Environment was called because concerns similar to those expressed in 1908 had emerged at the global level during the 1960's; namely, how to protect and conserve the world's environment and natural resources without impeding development and economic growth.

This year marks the 10th anniversary of the Stockholm Conference, and the U.N. environment program will convene a special session to commemorate this occasion, which I understand will be held in Nairobi, Kenya. The Subcommittee on Human Rights and International Organizations, which oversees international environmental policy, is holding a series of three hearings whose purpose is to:

One: Establish a scorecard of the major accomplishments and failures since Stockholm;

Two: Assess where we stand today in relation to global environmental problems; and

Three: Explore the global environmental agenda for the 1980's.

This morning's session will present a general overview of developments since Stockholm. The second hearing, on April 1, will look at problems in specific issue areas like oceans, the atmosphere, and species loss. The third hearing, set for April 20, will look into the future and the role of international organizations.

THE STOCKHOLM CONFERENCE

Representatives of 113 countries met in Stockholm in June 1972 for the U.N. Conference on the Human Environment. The conference represented a political landmark:

> For the first time in history, the nations of the world sat down together to seek a better understanding of each other's environmental problems and to explore opportunities for action, individually and collectively. [President's statement, June 1972.]

TEN YEARS AFTER STOCKHOLM

Stockholm is generally regarded as having been "a powerful force for change." Over the past decade, public awareness in both developed and developing countries about the implications of environmental change has certainly increased, but actual progress in resolving global environmental problems remains uneven. While the United States achieved practically all of its objectives at Stockholm, a comparison of these achievements and the status of these programs today reveals a significant shift in attitude and priorities.

U.S. OBJECTIVES AT STOCKHOLM

One: The conference approved a U.S. proposal to create a U.N. environment program and a $100 million environment fund. The United States pledged $40 million to the fund over a 5-year period.

Status today: The United States has contributed over $70 million to UNEP but the Reagan administration requested only $2 million for fiscal year 1982 and $3 million for fiscal year 1983. Congressional action assured UNEP will get $7.85 million in fiscal year 1982 and a proportionate share in 1983.

Two: The conference overwhelmingly adopted a U.S. proposal for a 10-year moratorium on commercial whaling.

Status today: Commercial whaling quotas have decreased by 70 percent since 1973, but five species are still hunted commercially. The 1982 commercial whaling quotas total 13,448.

Three: The conference endorsed a U.S. proposal for an international convention to regulate ocean dumping.

Status today: A convention on ocean dumping was adopted in the fall of 1982, but the Navy is now considering dumping old radioactive submarines in deep oceans, and the Department of Energy is studying whether to dump low-level radioactive waste at sea.

Four: The conference endorsed a U.S. proposal for a World Heritage Trust Fund to help preserve cultural and natural landmarks.

Status today: The world heritage list now has 112 properties, and 8 U.S. sites, including Olympic National Park, are listed. The Reagan administration did not request a voluntary contribution for fiscal year 1982, and annual U.S. funding of $330,000 will lapse as a result.

I would now like to welcome our distinguished witnesses to the subcommittee, some of whom participated in the 1972 Stockholm Conference. We are privileged to have before the subcommittee today a distinguished panel who will provide us, hopefully, with a body of testimony that will give us the basis for the subsequent hearings.

We are pleased to have among the witnesses at least two who were attendees at the 1972 Stockholm meeting, so we certainly will benefit from their knowledge and from their perceptions about the state of our environmental progress since that time.

I would like to introduce now, to lead off in this series of hearings, a very distinguished Member of the U.S. Senate, the ranking minority member on the Senate Foreign Relations Committee, and one who attended the Stockholm Conference.

Senator Pell, it is an honor to have you before our subcommittee, and we are looking forward to your statement this morning.

STATEMENT OF HON. CLAIBORNE PELL, U.S. SENATOR FROM THE STATE OF RHODE ISLAND

Senator **Pell.** Thank you very much, Mr. Chairman, for your hospitality and courtesy in permitting me to be here.

I congratulate you and the subcommittee on holding these very important hearings on the state of the international environment 10 years after Stockholm. More than any other set of foreign policy issues—except, of course, for the ultimate environmental disaster of nuclear war—the future of this fragile planet depends on how we treat it today.

I have a longer statement which I will submit for the record and which I will summarize. It was nearly 10 years ago, I remember, that I reported to the Senate on the just-concluded U.N. Conference on the Human Environment to the effect that:

> The end of this conference marks the beginning of a new era in the history of international relations. It is the first small step in a global cooperative effort to preserve and improve our planet's environment.

I remember so well the atmosphere and the climate at that meeting. It reminded me of the San Francisco Conference where I had the honor to participate a good many years earlier in founding the United Nations. One felt the same sense of creativity and optimism about the future as that conference mapped out the various programs to be undertaken.

I believe, in fact, that conference was the turning point we all hoped it would be. Among the Stockholm recommendations which have been actually implemented are:

One: The establishment of a United Nations environmental program;

Two: The establishment of the United Nations Environmental Fund;

Three: The conclusion of the Convention on the Prevention of Marine Pollution by Dumping Wastes and Other Matter;

Four: The establishment of an Earthwatch program; and

Five: A series of conventions to protect wildlife. While regrettably there has been no moratorium on commercial whaling as recommended by the conference, there has been a significant reduction in the whale kill.

Another extremely important though less tangible result of Stockholm and of UNEP's activities is the recognition that environmental degradation is a global problem that must be solved by cooperative global action. This recognition is increasingly shared by the Third World.

At first the prevailing view in many developing countries was "You developed nations have been allowed to pollute the Earth; it is our turn now." I think they recognize the disadvantages of moving in that direction.

The achievements of Stockholm would not have been possible without the participation and leadership of the United States. Ten years later, how sad it is to note today that this administration, in its fiscal year 1983 budget, proposes to cut our contribution to UNEP to a mere 30 percent of the fiscal year 1981 level, and parenthetically I would add here that the original administration proposal for the 1982 budget was to eliminate entirely, our contribution to the United Nations environmental program. Now, for those who are true environmentalists, this is a hard viewpoint to comprehend.

I believe we must, as a matter of the highest priority, restore U.S. leadership in the international environmental area and reaffirm our commitment to the multilateral approach to resolving these serious global problems. In my prepared statement there are mentioned several specific proposals.

First, I think we should have the consistent high level of American support for the United Nations environmental program. Last year, I proposed earmarking $10 million for the U.S. contribution to UNEP, a level which your committee has also supported. I believe UNEP has played a critical role as a catalyst for reaching international agreement on environmental measures, as a monitor of global environmental developments, and as a source of information on environmental questions.

Second, I would urge a strong U.S. commitment to the UNEP regional seas program, including U.S. participation and financial commitment to the Caribbean and South Pacific action plans. It is, in my view, a strange ordering of priorities that this administration should propose hundreds of millions of dollars for the Caribbean Basin initiative and for regional military assistance and yet has so far failed to come up with a mere $500,000 contribution to the Caribbean Trust Fund.

The U.S. failure to contribute to the Caribbean action plan is, even in security terms, pennywise and pound foolish. However, I understand the problem is being looked at by the administration at this time and I am hopeful that they will reconsider this matter and will see fit to make a small but necessary contribution.

Third, I would hope the administration could proceed to negotiate a treaty requiring the preparation of an international environmental assessment for any major project, action, or continuing activity which may adversely affect the physical environment or environmental interests of another nation or the global commons. This treaty proposal, which was unanimously endorsed by the Senate in 1978 in a resolution I sponsored, would obligate parties to recognize and, hopefully, accept some responsibility for the international environmental consequences of certain large scale economic projects.

I would ask unanimous consent to have inserted in the record a copy of the draft treaty.

Mr. **Bonker**. Without objection, it will be so ordered.

Senator **Pell**. Thank you, sir.

[The material referred to follows:]

95TH CONGRESS
2D SESSION

S. RES. 49

[Report No. 95-990]

IN THE SENATE OF THE UNITED STATES

JANUARY 24 (legislative day, JANUARY 19), 1977

Mr. PELL submitted the following resolution; which was referred to the Committee on Foreign Relations

JULY 17 (legislative day, MAY 17), 1978

Reported by Mr. SPARKMAN, with an amendment to the text and an amendment to the title

JULY 21 (legislative day, MAY 17), 1978

Considered, amended, and agreed to

RESOLUTION

Expressing the sense of the Senate that the United States Government should seek the agreement of other governments to a proposed treaty requiring the preparation of an International Environmental Assessment for any major project, action, or continuing activity which may be reasonably expected to have a significant adverse effect on the physical environment or environmental interests of another nation or a global commons area.

Whereas there is a vast potential for human betterment through those projects, actions, and continuing activities that modify the Earth (its land, its waters, and its atmosphere) in

VII

environmentally sound ways that are consistent with the Earth's natural ecology and under careful controls designed to avoid or minimize any adverse environmental effects; and

Whereas there is potentially great danger to the world ecological system and to the well-being of individual nations if such activities are not controlled or conducted with sufficient regard to their potentially adverse effects on the physical environment or environmental interests of other nations or a global commons area: Now, therefore, be it

Resolved, That it is the sense of the Senate that the United States Government should seek the agreement of other governments to a treaty along the following general lines.

"The Parties to this Treaty,

"Recognizing the vast potential for human betterment through those projects, actions, and continuing activities that modify the Earth (its land, its waters, and its atmosphere) in environmentally sound ways that are consistent with the Earth's natural ecology and under careful controls designed to avoid or minimize any adverse environmental effects; and

"Aware of the great danger to the world ecological system and to the well-being of individual nations if such activities are not controlled or conducted with sufficient regard to their potentially adverse effects on the physical environment or environmental interests of other nations or a global commons area,

"have agreed as follows:

"ARTICLE I

"Before a State Party to this treaty, including any nongovernmental entity within the territory of such a Party, undertakes any major project, action or continuing activity within its territory or within areas not subject to the jurisdiction of any nation (that is, a global commons area) which may be reasonably expected to have a significant adverse effect on the physical environment of another State or States Party to this treaty or on a global commons area, an International Environmental Assessment regarding the potential adverse environmental effect of such activity shall be prepared and submitted by the government of the initiating State to the affected Party or Parties and to the United Nations Environment Program (UNEP).

"ARTICLE II

"(1) A Party considering an activity subject to the provisions of Article I shall, upon request, consult with the affected Party or Parties or, in the case of a global commons area, with UNEP, with a view toward preventing or minimizing any potential adverse environmental consequences beyond its territory which might result from the proposed activity.

"(2) The Party considering the initiation of such an activity shall at the request of a Party potentially affected, or at the request of UNEP whenever a global commons area is potentially affected, refrain from initiating the project or activity for a period of not more than 90 days after submission of an international environmental assessment to permit consultation, unless in the opinion of the Party considering initiating the project, action or activity there is such urgency that any delay for the purposes of carrying out the provisions of this Article or Article III would involve serious risks to the safety of life or property or would otherwise be clearly infeasible. In such cases, the negative response to a request to refrain from initiating a project, action, or activity shall set forth fully the nature of the conditions requiring immediate action.

"ARTICLE III

"Any dispute arising between two or more of the States Parties concerning the interpretation or application of the present Treaty shall be settled by negotiation, inquiry, mediation, conciliation, arbitration, judicial settlement or other peaceful means of their own choice.

"ARTICLE IV

"Five years after the entry into force of this Treaty, a conference of Parties shall be held at Geneva, Switzerland, in order to review the operation of this Treaty with a view to assuring that the purposes of the preamble and the provisions of the Treaty are being realized. Such review shall take into account relevant technological developments and consider the need for developing procedures for the assessment of liability regarding State responsibility for damage to the environment of other States or areas beyond national jurisdiction.

"ARTICLE V

"(1) Any Party may propose an amendment to this Treaty. The text of any proposed amendment shall be submitted to the Depositary Government which shall circulate it to all Parties to this Treaty. Thereafter, if requested to do so by one-third or more of the Parties, the Depositary Government shall convene a conference, to which it shall invite all the Parties, to consider such an amendment.

"(2) Any amendment to this Treaty shall be approved by a majority of votes of all the Parties to this Treaty. The amendment shall enter into force for those Parties accepting the amendment upon the deposit of instruments of ratification by a majority of all the Parties accepting the amendment upon the deposit of instruments of ratification by a majority of all the Parties.

"ARTICLE VI

"(1) This Treaty shall be of unlimited duration.

"(2) Each Party shall have the right to withdraw from the Treaty upon 90 days notice to one or more of the Depositary Governments.

"ARTICLE VII

"(1) This Treaty shall be open to all States for signature. Any State which does not sign this Treaty before its entry into force in accordance with paragraph 3 of this Article may accede to it at any time.

"(2) This Treaty shall be subject to ratification by signatory states. Instruments of ratification and instruments of accession shall be deposited with   and   which are hereby designated the Depository Governments.

"(3) This Treaty shall enter into force on the thirtieth day following the date of the deposit of the instruments of ratification or accession by one-fourth of the Signatory States.

"(4) For States whose instruments of ratification or accession are deposited subsequent to the entry into force of this Treaty, it shall enter into force on the date of the deposit of their instruments of ratification or accession.

"(5) The Depositary Government shall promptly inform all signatory and acceding States of the date of each signature, the date of deposit of each instrument of ratification of and accession to, this Treaty, the date of its entry into force, and the date of receipt of any requests for conferences or other notices.

"(6) This Treaty shall be registered by the Depositary Government pursuant to Article 102 of the Charter of the United Nations.".

Senator Pell. Finally, as I have also done in Senate Concurrent Resolution 74, I would urge the Reagan administration to conclude and approve a Law of the Sea Treaty containing strong marine environmental protections. Failure to reach agreement on other provisions of the treaty—notably the deep seabed mining provisions—could mean that the marine pollution control provisions will be lost as well.

Over the next few decades, the world community must face and work to resolve the global environmental consequences of tropical deforestation, soil depletion, decertification, depletion of species, and overpopulation. United States leadership in the necessary cooperative effort to resolve these problems is imperative, a position from which we have slipped.

I would add, when it comes to supporting UNEP, it is not just this administration that flagged in that regard; the previous administration likewise failed in its support of UNEP and we in the Congress had to increase the budget.

Thank you.

[Senator Pell's prepared statement follows:]

PREPARED STATEMENT OF HON. CLAIBORNE PELL, U.S. SENATOR FROM THE STATE OF RHODE ISLAND

Mr. Chairman, at the outset, I would like to commend you and the Subcommittee on holding these very important hearings on the state of the international environment ten years after Stockholm. More than any other set of foreign policy issues -- except, of course, for the ultimate environmental disaster of nuclear war -- the future of this fragile planet depends on how we treat it today. Regrettably, this subject does not receive the priority it deserves from policy makers and media preoccupied with the crisis of the hour. Your hearings, therefore, rightly focus attention on the long term nature of this important problem.

Nearly ten years ago I reported to the Senate on the just-concluded United Nations Conference on the Human Environment, at which I had been a participant. At that time I said:

> "The end of this Conference marks the beginning of a new era in the history of international relations. It is the first small step in a global cooperative effort designed to preserve and improve our planet's environment."

I believe the Stockholm Conference has been the kind of turning point we all hoped it would be. One test of its success is the action that was taken on its recommendations. While I do not intend to review all 109 such recommendations, I think there has been remarkable follow through on the most important ones. These include:

1) The establishment of a permanent organization to coordinate environmental programs within the United Nations. Shortly after

Stockholm, the 27th General Assembly adopted Resolution 2997 and created the United Nations Environmental Program (UNEP) with its headquarters in Nairobi. In its brief existence, this agency has developed a remarkable record as a catalyst for international cooperation in the environmental arena.

2) The establishment of a United Nations Environmental Fund. This fund, which consists entirely of voluntary contributions, has approached $125 million in the period 1978-81.

3) A convention to control ocean dumping. This convention, the "Convention on the Prevention of Marine Pollution by Dumping Wastes and Other Matter", was completed by December 1972 and came into force August 30, 1975. The Convention obligates parties to enact legislation and regulations controlling the quantity and toxicity of pollutants dumped into the oceans.

4) A ten year moratorium on commercial whaling. Although the International Whaling Commission (IWC) has not approved a moratorium, the Commission has sharply reduced whale quotas so that, in 1980-81, the overall whale kill was just a bit more than one-third of the 1974-75 figures. Even more dramatic reductions have been made in the quotas of the more threatened species, notably the Sperm and Sei whales, and I am hopeful a moratorium will eventually be adopted.

5) The establishment of an "Earthwatch" program for monitoring pollution levels. The "Global Environmental Monitoring System" (GEMS) was setup pursuant to this recommendation and is generally considered

one of UNEP's most successful programs. Information is exchanged through Infoterra, the computer-based network of national environmental systems which provides the 112 participating countries with access to 8,500 information sources. In 1975, the International Register of Potentially Toxic Chemicals (IRPTC), became operational. This facilitates efforts to avoid serious unintended consequences of chemical use.

6) Conventions to protect wildlife. These include: 1) the highly successful Washington Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES), now with 75 contracting parties, and which has provided significant protection to endangered species by reducing drastically the demand for them; 2) the "Convention on the Protection of World Cultural and Natural Heritage" which is acceded to by more than 50 nations; the Bonn Convention on the Conservation of Migratory Species; and regional conventions on the Conservation of polar bears, the Conservation of Nature in the South Pacific, and for Amazonean Cooperation.

As important as these concrete achievements are, the Stockholm Conference had an even more profound result. For the first time, the nations of the world recognized that pollution and environmental degradation have global consequences and, for the first time, the world community committed itself to deal with the problem globally. It is that recognition and that commitment that has made possible the kind of results -- almost unprecedented for a U.N. conference -- that have followed from Stockholm. It is also this recognition and commitment that has made the United Nations Environmental Program an extremely effective catalyst for environmental action and is, of course, the reason I have consistently advocated a high level of U.S. support for UNEP.

I want to stress that so much of the international environmental movement, and the measures I cited a minute ago, were the results of United States initiatives. Ten years ago, following the Stockholm Conference, President Nixon issued a statement which is justifiably boastful in tone. "The United States" he said "achieved practically all of its objectives at Stockholm." He went on to describe the establishment of UNEP as "an important step which had our full support", the approval of the $100 million U.N. environmental fund as something "which I personally proposed last February." President Nixon also expressed pride in the approval of "the U.S. proposal" for a moratorium on commercial whaling", in the endorsement of "our proposal" on ocean dumping, and in the support given the "U.S. proposal for the establishment of the World Heritage Trust."

Ten years later, how sad it is to note today that this Administration, in its fiscal year 1983 budget, proposes to cut our contribution to UNEP by 70% of the FY 81 level.

I believe we must, as a matter of the highest priority, restore U.S. leadership in the international environmental area and reaffirm our commitment to the multilateral approach to resolving these serious global problems. I would like to suggest some specific steps that can be taken to strengthen our resolve in these matters. The range of problems is, of course, immense, and my own proposals are by no means exhaustive.

First, I would urge a consistent and high level of U.S. support for the United Nations Environmental Program. Last year, I proposed earmarking $10,000,000 for the U.S. contribution to UNEP, a level which your committee has also supported. I believe UNEP has played a critical role as a catalyst for reaching international agreement on environmental measures, as a monitor of global environmental developments, and as a source of information on environmental questions. Two UNEP initiatives are of particular interest to me -- the Regional Seas Program and the effort to develop a system of environmental law.

One important achievement of UNEP -- perhaps the most important -- is often overlooked. This is the success UNEP has had in persuading Third World countries that environmental degradation is very much a Third World concern and not merely a problem for high consumption societies. Credit for this consciousness-raising is particularly due to UNEP Director Mustafa Tolba.

Second, I would urge a strong U.S. commitment to the UNEP Regional Seas Program including U.S. participation and financial commitment to the Caribbean and South Pacific Action Plans.

The Mediterranean Action Plan -- with the participation of all the littoral states except Albania -- is a model of how necessary and how productive regional cooperation can be in protecting ocean environments and the watersheds. It is, in my view, a strange ordering of priorities that this Administration should propose hundreds of millions of dollars for the Caribbean Basin Initiative and for regional military assistance and yet has so far failed to come up with a mere $500,000 contribution to the Caribbean Trust Fund.

The U.S. failure to contribute to the Caribbean Action Plan is, even in security terms, penny wise and pound foolish. Deforestation, destruction of watersheds, and a worsening of water quality -- all problems to be addressed by the Action Plan -- are very much part of the cause for the deterioting economic base of the Caribbean.

I also find it unfortunate that, at the recent meeting in Rarotonga, Cook Islands on the South Pacific Action Plan, twenty states were represented inclduing France, Australia, Great Britain and New Zealand -- but not the United States.

Third, I would urge the Administration to proceed to negotiate a treaty requiring the preparation of an International Environmental Assessment for any major project, action, or continuing activity which may adversely affect the physical environment or environmental interests of another nation or the global commons.

This treaty proposal, in which I have a certain pride of authorship, has been unanimously endorsed by the U.S. Senate (S. Res. 49; 1978).

Such a treaty would take cognizance of the consequences of large scale economic projects -- for example dams, canals, nuclear reactors, the clearing of tropical forests -- which may have an impact, even if unintended, beyond a country's borders. With this treaty, the potentially aggrieved party would at least have an opportunity to make its views known before the damage was done.

UNEP, through its work in developing a system of international environmental law, is making progress towards such a treaty and should be strongly supported in this endeavor.

Finally, we must move to conclude and approve a Law of the Sea Treaty containing strong marine environment protections. Many of you may be aware of the important provisions of the current draft treaty -- provisions which for the first time would codify international environmental laws agreed to by the conference, as well as establish a framework for further elaboration of international environmental law.

To summarize briefly, the treaty contains provisions which establish general obligations for nations to cooperate in avoiding pollution, to monitor the state of the marine environment, to assess possible adverse effects of planned activities, and to promote technical assistance to developing countries in order to improve their capacity to cope with pollution associated with industrial development.

As I have done in S. Con. Res. 74, I would urge the Reagan Administration to conclude the LOS negotiations at the earliest possible moment, for failure to reach agreement on other provisions of the treaty -- notably the deep seabed mining provisions -- could mean that the marine pollution control provisions will be lost as well.

Mr. Chairman, as I saw the pictures of earth taken from the Space Shuttle I was reminded of Ambassador Stevenson's final speech at the U.N. Inspired by similar photographs from an earlier American space flight he said:

> "We travel together, passengers on a little space ship, dependent on its vulnerable reserves of air and soil, all committed for our safety to its security and peace; preserved from annihilation only by the care, the work, and I will say, the love we give our fragile craft."

Only by working together can we, the passengers on this planet, protect its fragile environment.

Mr. **Bonker**. Thank you, Senator Pell, for both your personal commitment and your leadership on the Senate side in support of the United Nations environmental program.

I am pleased that you added the statement about other administrations not fully supporting our commitment to UNEP. I was just as frustrated in the Carter years as I have been subsequently, and my feeling is that it has been an institutional problem. UNEP simply lacks support within the State Department, and every single time that the budget comes up for voluntary contributions to United Nations agencies, at least before this subcommittee, there is less than lukewarm support from the State Department.

Had it not been for your intervention and that of the person who will follow you on the witness panel, we probably wouldn't have been able to salvage whatever commitment we have ongoing to UNEP. So it is just one of those problems that we have within the State Department.

Thank goodness there are people like you to continue that commitment. When one looks at Stockholm and what you have outlined in your statement about our earlier commitments in 1972 to establish a United Nations program, which we have done, and to fund it; it was fairly ambitious, a $100 million fund, and the United States pledged $40 million over a 5-year period. We have already discussed what that represents in terms of our continuing problems with funding UNEP.

The conference also overwhelmingly adopted the U.S. proposal for a 10-year moratorium on whaling. This subcommittee oversees whaling and, in fact, my staff assistant just returned from Brighton where they had a spring session to continue monitoring commercial whaling in the world. While we have not achieved the desired goal, it is not because the United States has not been fully committed, and again, both the past administration and this administration have been fully committed to bring about that moratorium. I might add that this administration has been even stronger than the Carter administration on the whaling issue.

But the one that you referred to that is a little bothersome is our lack of commitment to the Law of the Sea. It seemed to me that Elliot Richardson had done a superb job in negotiating under difficult circumstances, and we were about 95 percent toward agreement on all of the articles in that convention. Now we seem to have a lack of support that in recent days has been perhaps renewed.

Do you see any prospect for us achieving a Law of the Sea Treaty within the next few years? And what would the sense be on the Senate side if such a treaty were submitted?

Senator **Pell**. I have been an adviser to everybody in the LOS sessions since it started. At this point it seems to me that if we don't sign and come aboard, there is a very real possibility of the treaty being signed by the rest of the world minus the four leading industrial nations. If that would happen, I think that would be really quite a tragedy in the long run.

As far as the treaty's prospects for being ratified by the Senate, I think can be ratified, but only if the administration itself gets behind it. At this point, I think the administration is a little torn on it and the administration policy toward the treaty is, I think, primarily dominated at this point by the seabed mining interests.

I recognize that we do not have everything we want in that treaty. On the other hand, we have the necessary military provisions, general economic provisions, pollution provisions, and the 12-mile territorial seas, in the 200 miles exclusive economic zone, the 350-mile oil exploration zone, which is just about what we wanted.

So for every give there is some take, and you can't divide it up. My view is that it could be ratified, but not unless the administration gets behind it.

Mr. Bonker. Two years ago, during the course of Mr. Richardson's negotiations, we were hung up on the deep seabed mining issue. But eventually that was resolved. This subcommittee, along with that of Mr. Bingham, acted favorably and the seabed mining bill sailed right through. I thought we had broken that logjam, at least as it relates to deep sea mining.

Given the Senate's recent record for ratifying treaties, I just wonder whether it is possible to get any kind of treaty through that august body.

Senator Pell. At this point, as I said, unless the administration gets behind it, we would have a very hard time.

Mr. Bonker. I have seen in past years, with the administration fully behind a treaty, it still did not pass.

Senator Pell, it is a pleasure to have you before the subcommittee. Do you intend to participate in the upcoming 10-year reunion at Nairobi?

Senator Pell. No. I would like to go, but I have other commitments here. But it is very important that some delegations go from the Congress. I hope somebody may go from your committee.

Mr. Bonker. Well, I would hope that maybe you could talk to your colleagues on the committee, and even outside the committee, people like perhaps Senator Tsongas, who is interested in the environment. When the Director of UNEP was here a few weeks ago he was hoping that Congress would have strong representation at the Nairobi session. But on the House side, as you know, we are all up for election, and it seems to be one of those years where everybody is running scared. I don't think you are going to have strong representation from this side.

Senator Pell. I am afraid, realistically, there may not be very much from the Senate. I will do my best. I also informed Mr. Tolba of the problems we would be facing there.

Mr. Bonker. They should realize it is not a lack of interest or support, but a matter of logistical and political realities that exist in the Congress these days.

Senator Pell. I would like to add in conclusion how lucky we are in the environmental field in having a strong advocate in Secretary Buckley, because that moves the strong interest in it from the bureau level up to a higher level, and that has not occurred since the Stockholm Conference.

Mr. Bonker. Thank you very much.

You just provided the introduction for our next witness, the Under Secretary of State for Security Assistance, Science, and Technology. Also, I would like to call to the witness table the Administrator of the Agency for International Development, Mr.

McPherson, and also the Chairman of the Council on Environmental Qualilty, Mr. Hill. These three gentlemen will represent the administration in this morning's hearings.

I think we shall begin with the Under Secretary of State for Security Assistance, Mr. Buckley, who is a former Member of the U.S. Senate and one of the congressional representatives to the Stockholm Conference.

I can only echo what Senator Pell stated before he left, Mr. Buckley, that all of us are indebted to you for your personal commitment and for helping in the 11th hour to get money restored to UNEP. As noted earlier, it has been a continuing problem with all administrations primarily because there seems to be a lack of support within the State Department for UNEP.

But because of your intervention and the support of Senator Pell, we were able to restore at least some money to the program, and I hope we can count on your support in the future. I think with that, I will ask you, then, to lead off on this panel representing the administration.

STATEMENT OF HON. JAMES BUCKLEY, UNDER SECRETARY OF STATE FOR SECURITY ASSISTANCE, SCIENCE AND TECHNOLOGY

Mr. **Buckley**. Thank you, Mr. Chairman.

Needless to say, I appreciate your very kind remarks and those of Senator Pell.

If I may, I will read a truncated version of my statement and ask that the full text be inserted in the record.

Mr. **Bonker**. Only a former Member of the Congress can appreciate the necessity for brevity. The full statement will be included.

Mr. **Buckley**. It goes without saying that I welcome this opportunity to testify before this hearing.

As one who was a member of the U.S. delegation in Stockholm 10 years ago, I have maintained a special interest in assessing the impact of that event, including the effectiveness of the programs and institutions which emerged from it.

In my view, the principal achievement of the Stockholm Conference was the development of a global consensus that concerted international action on the human environment deserved high priority. The often-cited "Spirit of Stockholm" did indeed transcend the disputes among governments which characterized the debates and meetings leading up to the conference, and later gave rise to an impressive institutional response by nations and international organizations.

Too often, our impatience with the pace of progress and our frustration with the magnitude of the job yet to be done cause us to ignore or to diminish many significant accomplishments. In this regard, when one recalls the global environmental picture at the time of Stockholm, we might all be able to agree that tremendous changes have indeed occurred worldwide over the decade—changes in attitudes, understanding, and behavior.

In the short span of 10 years, we have seen created a broad array of new institutions, laws, policies, and programs at the international, regional, and local levels. Most importantly, there are many success stories around the world about efforts of nations working alone and in concert to cope with pollution of the air, water, and land, and to maintain the productive capacity of the resource base.

We have also become much more sophisticated over the years in our understanding of and approach to environmental problems. In particular, our ever-improving scientific and technological capabilities for inventory and analysis have provided many new insights and additional information. In the process, we have determined that earlier perceptions about the nature of the problems and their potential impacts on society were sometimes incorrect or exaggerated.

On the other hand, we have discovered potential new problems that were unforeseen in 1972. For example, 10 years ago in Stockholm there was no discussion of such issues as PCB's, groundwater contamination from hazardous wastes, or the potential implications of the appearance of heavy metals in polar ice cores, stratospheric ozone depletion or CO_2-induced climate change.

Equally important, there is today broad international recognition that the global environment and its component ecosystems are far more complex than appreciated just a decade ago. A new United Nations report prepared for the commemoration of the Stockholm Conference this May highlights the increased worldwide awareness of the intimate "interconnections within the biosphere" as one of the major changes in environmental perceptions over the last decade. This has given rise to the rapid growth in interest in computer modeling of environmental conditions and interactions at scales that range from the global to individual ecosystems.

Associated with this complexity, however, is evidence which suggests that environmental systems are much more resilient to stress than had been previously suspected; and also that man's ability to adapt and respond to environmental conditions may similarly have been underestimated. The need to explore and evaluate these evolving perceptions will, in part, define the international environmental agenda for the 1980's.

One of your subcommittee's principal interests in these hearings is to assess the role and response of the United Nations environment program over the past decade.

Despite the normal startup problems, UNEP is now fully functioning and has initiated valuable work in close cooperation with American experts. From the very start, we envisioned UNEP's role as being unique within the United Nations system of organizations. We perceived UNEP as a focal point for raising environmental awareness on a worldwide basis, and as a catalyst for stimulating sound environmental management. It was designed specifically to provide improved program coordination and integration, an organization which would insure greater efficiency and impact from the rapidly increasing number of environmental activities beginning to be implemented by a multitude of international organizations and governments.

On the other hand, we have never viewed UNEP as a "bankroller" for environmental programs, nor as another development assistance institution. Over the past 10 years, the United States has persistently worked to insure that UNEP evolved in accordance with these criteria. We would all no doubt agree that UNEP's record has not been faultless. Nonetheless, UNEP has made an important difference in how the international community now thinks and acts about the environment. Through its catalytic programs, its financing of gap-filling activities from the UNEP Environment Fund, and by serving as an environmental conscience within the United Nations system, UNEP's contributions have been substantial.

It may be useful to examine briefly UNEP's activities. They fall into three basic areas which correspond to the major functional elements of the Stockholm Action plan: (1) environmental assessment; (2) environmental management; and (3) supporting measures.

Within the environmental assessment area—otherwise known as "Earthwatch"—the global environmental monitoring system (GEMS) is operational, although there are gaps in its coverage and the dissemination of the information obtained is not all that it should be. INFOTERRA, the worldwide information referral service, is functional, albeit underused.

An International Register of Potentially Toxic Chemicals is in place, with an active publication program. And scientific information on the problems of stratospheric ozone depletion is being made available to a widening circle of Government policymakers through UNEP's Coordinating Committee on the Ozone Layer. The United States is a major participant in all these activities.

With respect to environmental management, UNEP's efforts have resulted in the development of several important international and regional conventions, and also a series of global action plans such as those for desertification control and ozone depletion. Much of this activity has been carried out in close cooperation with other United Nations agencies and international nongovernmental organizations.

For example, the World Conservation Strategy, a major UNEP achievement, was developed as a cooperative effort of UNEP and the International Union for the Conservation of Nature and Natural Resources (IUCN), with the support of the World Wildlife Fund, FAO, and UNESCO. In response to a U.S. initiative, UNEP has convened two major international meetings of experts during the past 2 years to design a coordinated international program to improve the management of the world's tropical forests. Again, this effort has brought together experts from a broad array of United Nations agencies, governments, and nongovernmental organizations.

In the area of supporting measures—environmental education and training, technical assistance, and public information—UNEP and UNESCO have collaborated effectively on a series of environmental education programs, and a number of other cooperating United Nations agencies now include environmental training programs among their activities.

Finally, it should be noted that the regional seas program, perhaps UNEP's greatest success thus far, encompasses activities falling under all three headings.

In appraising UNEP's effectiveness during its first decade, I would like to highlight two of its most important program areas, GEMS and the regional seas program. I suspect that the contribution already made by GEMS is not fully appreciated in the United States. Through it, uniform standards for the collection of environmental monitoring information have been adopted by the participating countries.

The atmospheric data routinely collected under GEMS auspices covers a wide range of potential pollutants as well as substances of immediate concern. In Europe, for instance, an atmospheric data collection system was started with seed money provided through the GEMS program. The system has provided useful information on sulfur compounds in the atmosphere to the United States and other signatories to the Convention on Long Range Transboundary Air Pollution negotiated under the auspices of the United Nations Economic Commission for Europe.

Still, GEMS can be improved. The system's coverage should be broadened and the various components integrated more efficiently. Improved standardization of the methodologies for data collection and analysis is also necessary. Above all, the dissemination of GEMS-derived information should be substantially widened. The fact that GEMS can be improved, however, should not detract from the progress made toward the goal of providing an operational system for monitoring and assessing the health of the Earth's environment on a continuing basis.

As I noted earlier, the regional seas program probably represents UNEP's high-water mark in implementing the Stockholm action plan. There are now 10 subprograms covering various regional seas, including one for the Caribbean in which the United States is participating.

UNEP's efforts have revealed a surprising potential for bringing diverse countries together for purposes of protecting and improving the productivity of the water bodies which they share. The best example is offered by the program for the Mediterranean, UNEP's initial effort in this area. Pollution of the Mediterranean had reached alarming proportions when the activity was launched, but the situation seems to be on the way toward improvement with the initiation of a variety of remedial steps, beginning with the regulation of discharges from ships and from land-based sources.

The very fact that this effort has gained the endorsement and support of countries as diverse socially, politically, and economically as the Mediterranean littoral states constitutes a remarkable achievement. This could not have happened without UNEP's initiative and its ability to stimulate the countries to join together on concerted actions to address critical problems of common concern.

As mentioned earlier, we have had our problems with UNEP—as with other international bodies in which the United States participates—and we have persistently and aggressively made our views known to the UNEP Secretariat and to other governments.

We have urged, for example, that more attention be paid to sound program design and less to the financing of small, ad hoc projects. We have asked for a sharper focusing on fewer priorities, although we recognize that the Executive Director is faced with the difficult problem of responding to what are often competing priorities enunciated by the 58 member states of the Governing Council.

We have also complained on more than one occasion about UNEP's failure to maintain harmonious working relationships with other United Nations specialized agencies, to the detriment of its ability to perform effective interagency coordination. And we have urged them to seek larger financial contributions by other member governments to the environment fund and to insure that they be made in fully convertible currencies.

Some of our earlier concerns about UNEP's programs and operations have been satisfactorily resolved; others remain. You have my assurance, Mr. Chairman, that we will continue to press UNEP to carry out with greater efficiency and effectiveness the role envisioned for it when the organization was proposed in 1972.

Turning now to the subject of the United States response to the Stockholm action plan, over the past 10 years I believe that the United States has been, by any measure, a world leader in the international environmental field. We have led by example through our domestic efforts to protect and to improve the quality of this Nation's water, air, and land resources.

Virtually all sectors of America have been involved—the Federal executive, judicial and legislative branches, private industry, the scientific community, State and local governments, nongovernmental organizations, the media, and the general public. And judging by recent polls, public interest and commitment remain very high.

At the bilateral level, as Mr. Peter McPherson will testify, the U.S. Agency for International Development has been in the forefront of development assistance institutions in carrying out environmental reviews of its proposed projects, and also in supporting activities specifically designed to address the natural resource management and environmental protection needs of developing countries.

This leadership role was appropriately recognized by the International Institute for Environment and Development (IIED) in a recent assessment of the environmental policies, procedures, and practices of the donor agencies of 9 countries, including the United States. AID's financial support for environmental and natural resources management activities has, for example, grown from $13 million in fiscal year 1978 to a requested fiscal year 1983 level of $153 million, a more than tenfold increase.

Multilaterally, the United States was instrumental in helping establish most of the international environmental organizations in existence today; for example, UNEP and the environmental committees of the OECD, NATO, and the ECE. We continue to be the major financial contributor to international environmental programs, and U.S. scientists, technicians, and managers from both the public and private sectors provide countless hours of supporting services each year to these programs.

The United States has also been in the forefront in the design and negotiation of most of the major international conventions and treaties that we and other nations look to today to control pollution of the global commons and to protect natural resources of common concern. These include the Convention on the Prevention of Marine Pollution by Dumping of Waste and Other Matters, that is, the London Dumping Convention; the Convention on International Trade in Endangered Species on Wild Fauna and Flora (CITES); the Convention for Conservation of Antarctic Seals; the Agreement on the Conservation of Polar Bears; and the Convention on Long Range Transboundary Air Pollution.

Therefore, I believe that any objective evaluation of U.S. international environmental efforts over the past decade will reveal that we stand second to none in efforts of governments to meet the spirit and intent of the Stockholm action plan. Clearly, we might have done more in certain areas, and done some things differently.

We also acknowledge that there remains a great deal more to do to insure that the health and productive capacity of this planet and its inhabitants are maintained over the generations to come. However, I feel that we can deservedly take some measure of pride in both the quantity and the quality of U.S. contributions in the international environmental field over the past 10 years.

This leads me to the issue of our international priorities for the next decade. In the face of continuing budget austerity, it is apparent that the rest of the 1980's will be a period of consolidation for the entire United Nations system, UNEP included. It thus becomes imperative that we all focus on those programs which truly merit priority attention on a global or regional basis. From my own point of view, the following areas of activity, which all fall within UNEP's mandate, deserve special emphasis:

First, monitoring and assessment of environmental conditions and trends.

We must rapidly upgrade present capabilities for anticipating the emergence of new problems, for monitoring changing environmental conditions, and for assessing the impact of remedial actions. Priority concerns should include such potential problems as climatic change, especially as related to carbon dioxide buildup; modification of the stratospheric ozone layer; acid precipitation; hazardous chemicals in the environment; and ocean pollution from land-based sources, particularly pollution of coastal estuarine ecosystems.

Second, management of land and biological resources.

Efforts must be intensified to curb excessive deforestation, to improve the productive capacity of semiarid and arid lands, and to prevent degradation of prime croplands from erosion, salination, and water logging.

Other priorities include protection of wildlife and maintenance of our stock of genetic diversity. In each of these areas, we can do much better than we have to date with the knowledge and tools already at our disposal. The challenge is to apply these intellectual and technological resources more systematically and more effectively.

Third, environmental education, training, and information dissemination.

Significant advances have been made over the past decade in expanding awareness, knowledge, and trained manpower, and these efforts should be maintained and expanded. In a March 17 message to the International Union for the Conservation of Nature and Natural Resources, President Reagan stated that:

> The greatest resource that all nations share is people. The emphasis of our cooperation should focus on developing the knowledge and skills that will help individuals and organizations to formulate sounder policies and programs. Skilled people are the cornerstone for building institutions that will ensure the long-term success of our development and natural resource conservation efforts.

A final word on future priorities. I mentioned earlier the need to improve the quality of the scientific and technical data, and the data analysis on which effective environmental programs and policies must be based. Since Stockholm, there have been instances where efforts to reach international agreement on measures to deal with perceived environmental threats have been slowed or thwarted by lack of an adequate understanding of the source and magnitude of the threat, the potential implications for society, and the costs and benefits of alternative control measures.

Recent examples include UNEP's effort to develop an International Convention to Protect the Ozone Layer, and our ongoing negotiations with Canada on a transboundary air pollution agreement. We need to be sure of our facts as to environmental causes and effects, and we must be able to justify the cost of control measures before they are put into effect. Otherwise, we risk undermining the credibility of environmental concerns.

Accordingly, although our specific agenda is in the process of being developed by the interagency group chaired by Mr. Alan Hill, we plan to urge that, throughout the United Nations system, high priority be attached to examining, strengthening, and expanding the scientific foundation for understanding and addressing environmental problems.

At the upcoming UNEP Session of a Special Character, for example, and also during consideration of UNEP's proposed new United Nations System-Wide Medium Term Environment Plan for 1984-89, we intend to urge that heavy emphasis be given to environmental research, data analysis, and information dissemination.

With respect to U.S. participation in the Session of a Special Character to be convened May 10-15 in Nairobi, we are assembling a strong delegation at a level commensurate with the ceremonial significance of that event, and one which will symbolize and reflect a continued U.S. commitment to international environmental affairs.

I look forward to heading the delegation, which we expect will include senior-level representation from other U.S. Government agencies as well as from private-sector institutions. The Department of State has also invited congressional participation. I hope, given the colloquy I heard between you and Senator Pell, that it will be possible to have prime environmentalists from the Congress in attendance.

Our substantive preparations are going forward on an interagency basis, and we are seeking the views and ideas of a broad range of nongovernmental organizations and the business community. We are also utilizing our Embassies to obtain information on the attitudes and positions of other governments with respect to the issues that will come before the Special Session—and the follow-on 10th Session of UNEP's Governing Council—and also to determine whether new proposals will be introduced by other nations at these meetings. With this broad input, we believe that the United States will be in a strong position to play an active, constructive, and useful role in Nairobi this May.

In closing, I would like to say that we believe that international cooperation on environmental and natural resources issues over the past decade has been extremely effective and that it has been of direct and significant benefit to the United States and its citizens. In the 1980's, we plan to continue our attempt to mobilize collaborative action on problems and issues of global concern, and to assist other nations in confronting environmental threats to the extent that they seek our help and we have the resources to respond.

Multilaterally, we will maintain our commitments to support international environmental programs, but we will demand more from them in terms of better coordination, stronger management and fiscal controls, and improved program design and project selection. We will adhere to the principle that the economic development essential for improving the human condition can be achieved only if we protect and sustain the earth's renewable resource base and only if we learn to live in harmony with the natural world.

I thank you, Mr. Chairman, for this opportunity to appear before you.

Mr. BONKER. Thank you, Mr. Buckley, for an excellent statement.

I wish the administration could find not only the financial but the policy commitment to carry out all that has been mentioned in your statement this morning. We will proceed to address some of those things during the question period.

I now call upon the Administrator of AID, which has some involvement in international environmental issues.

I would like to note at the outset that my earlier criticism of the lack of support within State does not fall upon Mr. Buckley's Bureau, but on another who is not represented this morning. So you don't have to feel compelled to defend or rationalize why that support hasn't been ongoing.

I hope that since you have not served in the Senate, Mr. McPherson, that you will follow Mr. Buckley's example and summarize your statement. The full statement will be included in the official record.

Mr. McPherson.

STATEMENT OF M. PETER McPHERSON, ADMINISTRATOR, AGENCY FOR INTERNATIONAL DEVELOPMENT

Mr. MCPHERSON. Thank you, Mr. Chairman.

I welcome the opportunity to be here today because we have found over the years that, in fact, success or failure of a whole wide range of projects that my agency administers is dependent to an important degree upon sensitivity to environmental and natural resources issues.

Our basic policy here has been to insure the environmental soundness of developing assistance projects we undertake and to provide assistance to developing counties in this area. Our program has gone from some $13 million worth of effort in 1978 to $153 million requested for 1983, a very substantial increase in a short period of time. This money has gone for institution building, environmental education and training, conservation and forestry projects.

Mr. BONKER. Is that money manifested in programs to recipient countries or is that a matter of supporting international efforts to deal with environmental problems?

Mr. McPHERSON. That money in large part is for country programs.

Mr. BONKER. Bilateral country programs?

Mr. McPHERSON. Yes. For example, we have large forestry programs in Haiti and the Dominican Republic, and we do country environmental profiles around the world. That is our bilateral program, $153 million projected in 1983.

The key to all this, of course, has been our impact assessment programs. We have a formal procedure concerning impact assessments in terms of project selection, and design. I think we are the only donor agency that has such a complete, formal procedure for impact assessment of projects.

This procedure involved early identification of activities, use of environmental design aids, involvement of recipient countries in the process, et cetera. We are finding—this isn't a complete study—but we are finding the assessment cost may be as low as .05 percent of the projects' cost. So it is a very cost-effective means of attempting to insure ultimate success.

We spend quite a lot of effort on training within AID. But, of course, as time has gone on we are shifting and increasing the number of short-term training courses for developing officials on a whole range of matters—environmental assessment techniques, watershed protection, agro-forestry et cetera.

Our country environmental profiling has been mentioned earlier here today. We think it is pretty important. We have completed initial profiles for a total of 47 countries; some 12 countries have in-depth, in-country studies either under way or completed.

I mentioned forestry earlier. Some 72 assistance projects are under way in 30 countries for which $136 million has been budgeted specifically for forestry-related work. Of this, $36.5 million is devoted to actual tree planting. More than half of that tree planting is done directly or indirectly with Public Law 480 programs.

An important part of the forestry effort is, of course, the institution building that we hope will accomplish much more than what we do directly in an ongoing kind of effort.

In the pesticide area we have established a policy addressing the provision or use of pesticides in connection with our projects. I think we are the only donor agency that has a formal procedure for such evaluation. We have on tap an advisory team of specialists that on short notice have been consulting with developing countries. We have been working with the private sector in this country. I think this is an important and not very expensive initiative that we are undertaking here.

We also have worked closely with the Peace Corps, especially in the last few months, attempting to coordinate our projects. Forestry has been one of the areas where we have been using Peace Corps volunteers in these efforts. It seems like a logical fit and has worked well.

The same kind of close working relationship has been established with the United States Forest Service. We have also established a fairly effective training program for private voluntary organizations on environment-related activities through a grant arrangement.

I can go on, Mr. Chairman, but to respond to your direction of brevity, let me say, to summarize, that we are really very proud of the efforts that we have underway. They are really quite substantial in total. I think our emphasis on the environment is making a real impact on not only what we are doing in the long term, but more importantly, we are having a fairly substantial impact upon the countries with which we are working.

We are also attempting to be persuasive with other donors, because this is not just what we can do, but what many other countries can do as well.

[Mr. McPherson's prepared statement follows:]

PREPARED STATEMENT OF M. PETER MCPHERSON, ADMINISTRATOR, AGENCY FOR INTERNATIONAL DEVELOPMENT

Mr. Chairman, I greatly appreciate this opportunity to appear before the Subcommitte to address the status of the global environment. This is my first appearance before the Subcommittee on Human Rights and International Organizations on the subject of natural resources and it is a great honor to be here. I believe the record of AID in this important area of development is a good one and I welcome the opportunity to bring it to your attention.

Mr. Chairman, as you are well aware, a great deal of discussion continues as to the real extent of global environmental degradation and its implications. What few people challenge however, is that the renewable natural resources of developing countries are today subject to stresses of unprecedented magnitude. These pressures are brought about in part, by increased population and the quest for an ever-expanding food supply. Because the health, nutrition, and general well-being of the poor majority are directly dependent on the integrity and productivity of their natural resources, the capability of governments to manage them effectively over the long term becomes of paramount importance.

Developing countries are becoming more aware of the ways in which present and future economic development must build upon a sound and sustainable natural resource base. Some are looking at our long tradition in environmental protection and are receptive to U.S. assistance which recognizes the uniqueness of the social and ecological systems in those tropical countries. Developing countries recognize the need to improve their capability to analyze issues and plan their own natural resources management. In February, 1981, for example, AID funded a National Academy of Science panel to advise Nepal on their severe natural resource degradation problems. Nepal's recently established environmental coordinative body sought the Panel's recommendations. Some countries, such as Senegal, India, Indonesia and Thailand, are now including conservation concerns in their economic development planning process. We expect to see this trend continue.

Because so many governments of developing nations have recognized the importance of these issues, the need today is not merely one of raising additional consciousness, but for carefully designed and sharply focussed activities aimed at the establishment of effective resource management regimes which are essential to the achievement of sustained development. Since the Stockholm Conference in 1972, the number of governmental agencies world wide, with environmental responsibilities has grown from 15 to 115 (See Appendix A).

The consequences of inadequate resource management are not subtle. The continuing reduction of tropical forest cover, soil erosion, the exhaustion of crop lands, the depletion of fisheries, the advance of desert frontiers and the adverse consequences of indiscriminate pesticide use are steadily intensifying; the need for more effective resource management in the developing countries is being increasingly felt. Since so little is actually known about the extent to which man can manipulate the world's tropical systems, AID's long-term development policies and strategies on natural resource management, forestry and environmental protection must focus on the following:

-- ensuring, through detailed analysis, the environmental soundness and long-term sustainability of AID assistance programs and projects.

-- assisting the LDCs to build the institutional capacity and scientific infrastructure required for identifying, assessing and solving their critical environmental and natural resource problems. This includes the utilization of appropriate technology in the providing of programs to address natural resource management problems.

-- Promoting environmentally sound development projects funded by multilateral and other bilateral development assistance organizations.

Before proceeding to describe each of these areas of attention in more detail, Mr. Chairman, I would like to stress the importance we place upon addressing these concerns as a part of our continuing commitment to furthering development by support of such key sectors as health, agriculture, and education. Just as the Congress has continued to refine AID's basic legislative mandate for environment and natural resources, we have steadily begun to address the problems as an integral part of development planning and design. Our programs have grown and we expect continued growth as the developing countries become more experienced in defining their development constraints and establishing priorities to overcome them.

SUSTAINABILITY OF ASSISTANCE

Developed vs. Developing Country Assessments

The methodology for conventional environmental impact assessment has been changing since the passage of the National Environmental Policy Act (NEPA) in 1970. Several hundred books and papers can be found on the subject. At a meeting in 1979 of the UN Asian and Pacific Development Institute, the conferees recognized the need for less involved and less costly assessment methodologies fitted to local conditions. They saw environmental considerations as a dimension of the planning process and saw the integration of environment and development as leading to changes that would increase self-reliance, public participation, family income and community development.

In many ways, this reflects the changing approach of AID to environmental impact assessment since the passage of NEPA. In the early part of the 1970s, AID prepared limited environmental guidelines for capital projects that were carried out mostly prior to 1973; formal environmental review procedures were adopted in 1976. These procedures were and still are the only formal procedures of any development agency--bilateral or multilateral. The procedures were patterned after the US approach but tempered to recognize the sovereignty and responsibility of the governments whose projects were being supported. At first, the assessments took on some of the characteristics of the early NEPA impact statements--separate documents prepared by a visiting team, performed often after the project planning was well under way, and highly duplicative of material presented elsewhere in project documentation. The statements prepared were in one way, however, not like those in the U.S.--over-burdened with data. Such detailed information simply does not exist in most developing country situations.

A More Realistic Approach

After two and a half years of experience with the original procedures, revisions were made to bring the environmental assessment process more in line with the reality of development in the less developed countries (LDCs). AID was seeking a pragmatic way of helping LDC decision makers understand the consequences of alternative development strategies while at the same time strengthening the capacity of the countries by involving them in the process at the earliest possible time in the long sequence of project development.

The changes were adapted from improved regulations of the Council on Environmental Quality under the National Environmental Policy Act and Executive Order 12114 concerning environmental effects abroad of major federal actions. It may be of interest, Mr. Chairman, to note that AID was the only agency not required to modify procedures as a result of the issuance of the Executive Order. AID was in fact already doing more than required under the Order.

The revised procedures, which became final (on October 23, 1980) introduced some appropriate flexibility in the environmental evaluation process and reduced the potential for delays in processing. They eliminated from the requirement of environmental review, categories of projects with little or no likelihood of environmental impact. Conversely, the procedures identified types of projects which most likely result in significant adverse impact which will always need further environmental study. For these projects, the procedures established a process of working with the host country to define, at an early stage, the likely areas of significant adverse impact to be fully evaluated during subsequent stages of project preparation. The procedures also now recognize the appropriateness of using some common design criteria for activities with predictable impacts or requiring a straightforward environmental review and encourage the participation of local or host government expertise as a means of strengthening their capabilities in this area.

Conclusions

In summarizing our experience with formal environmental review procedures, we would have to say that the process has been very beneficial to the Agency. It has served as a vehicle for anticipating impacts and subsequent costs that might have otherwise been undefined. The process has also served as a tool for increasing the understanding of AID officials as to the importance of the natural resource base to sustainable development. It has also been cost-effective. We currently have one study underway in the Near East Bureau which is looking specifically at the cost-effectiveness of environmental analysis for capital development type projects carried out under funding from the ESF account. An early analysis of 15 projects indicates that technical and feasibility costs average about 1% of total project costs and the environmental portion is averaging only about 2 to 5% of this 1% figure. Quite cost-effective, especially if costly mistakes are avoided.

The process of environmental examination has also avoided costly errors. One prime example is with the design of a project in the upper Huallaga region of Peru. As a component of a coca substitution strategy, the Upper Huallaga Agricultural Development Project was expected to expand agricultural production in order to minimize the negative social and economic effects of a program of coca eradication. The detailed environmental analysis determined that the physical environment of the project area would constrain the project as originally perceived. The project was modified, therefore, to emphasize research and testing of crop systems appropriate to that tropical environment.

In no instance has a country objected to the concept of environmental review of an AID assistance activity. In the case of Sri Lanka, the government asked AID to prepare an assessment on the proposed development of the entire Mahaweli river basin, not just that portion being supported by AID. The assessment not only brought about changes in the plans of various donors, it also led to additional activities designed to strengthen the capabilities of the government to manage their natural resources.

As you well know, Mr. Chairman, the Foreign Assistance Act was modified this past year to codify these procedures. Changes were made by the bill's supporters to incorporate many of the concerns of AID. At the present time we believe that our procedures comply with the Act's requirements and do not foresee any difficulties in continuing with the systematic review of AID projects as now called for in Section 118.

ASSISTANCE FOR NATURAL RESOURCES

Changing Emphasis

In early 1978, AID realized that all of its environmental concerns were devoted to the procedures of environmental review and the training of staff. Little organized attention was being devoted to understanding the environmental constraints to development in each country or developing a strategy to assist countries to better manage their resources. Our preoccupation with project soundness and the necessity to move into areas of natural resource assistance was most vividly expressed by an AID Mission Director who noted in part:

"AID's overwhelming focus in environment, despite some general rhetoric to the contrary, is in preventing environmental damage from AID's small piece of the action. We therefore insist on special studies, by U.S. experts, in order to design U.S. procedures which in turn control the use of U.S. money. But in [this country] there is an environmental nightmare unfolding before our eyes. And it has nothing to do with AID projects, or all the donor projects put together. It is the result of the

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acts of millions of [poor people], struggling for survival: scratching the surface of eroded land and eroding it further; cutting down the trees for warmth and fuel and leaving the country denuded; diverting streams to irrigate dry land and depriving others of their water source. Over 1 billion--1 billion--tons of topsoil flow from [the] highlands each year.

"The answer to this problem is not feasibility studies to control each of AID's projects. Nor is it directed "public works"--which the British tried and failed with for fifty years of conservation programs in east and southern Africa. The answer is in making environment part of the thinking and doing of the millions of individual [countrymen], who must also struggle for daily survival. This takes us back to the issue of the participation by the poor themselves. If AID has a contribution to make, it is in taking our environmental concerns, standards and criteria and translating them into meaningful guidelines that farmers can use and appreciate. It means drawing the people themselves into the decision-making process on environment and giving them the responsibility to build environmental protection into their self-help activities. Nothing is farther from this process than having initial environmental estimates for each of the people's small self-help activities, prepared by outsiders and approved 10,000 miles away in Washington, as AID procedures now encourage."

AID has since striven to make the environment part of the thinking and doing of all who are engaged in development assistance--be they AID personnel, LDC officials, consultants, or those assisted. Numerous activities have been orchestrated to help achieve this result. The range extends from training and conferences to development of environmental profiles and other institution strengthening activities. Some examples of this integration follow:

Foundation for Improved Assistance

Training and Sensitizing

Early efforts focussed on AID personnel through special courses, workshops, lectures and staff discussions. This was gradually augmented with regional workshops in Asia and Africa integrating discussions of energy, forestry and natural resource opportunities.

Major public conferences sponsored by AID in cooperation with the Department of State have also served to bring a balanced understanding of individual issues and a plan for assistance from the public and private sectors of the U.S. Most notable were the Strategy conferences on Deforestation (1978), Pesticide Management (1979) and the recently held Conference on Biological Diversity (1981).

Short Courses

With the advent of the Environmental Training and Management for Africa project covering thirteen countries, emphasis began to shift to the provision of specialized training for LDC personnel. This approach is now carried out in all regions. Examples of training include: "Watershed Management"--Philippines, Thailand, Panama and Honduras; "Agro-forestry"--Costa Rica; "Environmental Considerations in Regional Planning"--Tanzania; "Environmental Impact of Development"--Sudan; "Drought Preparation"--Botswana. Recently in Thailand, a course prepared by the private sector on "Environmental Assessment, Impact Evaluation, Management and Pollution Control" was presented to government officials from 22 different departments or authorities and represented 30 trainees ranging from policy analysts to environmental officers. A description of that program has been provided to other development organizations with whom we routinely share information regarding AID's environment and natural resource programs. Several have responded favorably to our offer to share an identification of individuals attending AID sponsored training for use as a potential source of in-country expertise or understanding of environmental issues. Such personnel could be useful to the donor community in the preparation of development projects.

A Compendium of AID's training courses including description, objectives and training materials utilized has been circulated to other donor organizations with the expectation that some may wish to develop similar programs or utilize materials already available.

Institution Building

In Indonesia, more direct institutional strengthening was combined with training through the provision of a grant designed to assist in the establishment of Environmental Centers at several universities. This project, with an output of direct technical support to the Minister for Environment and Development, has in part been an effective stimulus for other activities involving AID and other donors. One example is the National Watershed Development project being carried out in cooperation with the World Bank. This project, influenced by the Environment Ministry, recognizes that the most serious issue confronting government policy makers with respect to long-term agricultural development on the islands of Java, Bali, Madura and Lombok is the prospect of irreversible environmental deterioration of vital watersheds. This is due to extreme population pressure and the consequent introduction of sedentary agricultural practices on increasingly steep slopes. Reflecting the concern of the Environment Minister, the Government of Indonesia is seriously exploring alternative avenues for reorganizing and consolidating the government organizational structure, particularly within the Department of Agriculture in order that it can begin the process of preparing a national watershed management program.

Private and Voluntary Organizations (PVOs)

Training in the environment and natural resource areas for the private and voluntary organizations (PVOs) has also been increasing since 1979. The Coordination in Development Inc. (CODEL) organization has organized a series of US and overseas workshops for PVO personnel. An example is a recently completed course in Honduras covering "Soil and Water Conservation Management." About 50 PVO representatives participated in two sessions of two weeks duration. The course,presented in Spanish,was directed toward practical means of soil and water conservation. CODEL, with AID funding, has also published a variety of materials useful to the development process. Their booklets on "Environmentally Sound Small-Scale Agricultural Projects" and "Environmentally Sound Small-Scale Water Projects" have been widely distributed throughout the PVO community and are being translated into Spanish and French for wider utilization.

Areas of Special Emphasis

Profiling Process

The transition from emphasis on the environmental soundness of projects to assistance in natural resource areas requires more than sensitivity of staff and Agency commitment. Required is an interpretive analysis of selected environmental data to assist AID and LDC officials to formulate and prioritize environmental and natural resource needs. The process of preparing practical and concise information about the environmental situation in LDCs and following through with the country to define opportunities for assistance on the part of the U.S. and other donors, has been referred to in AID as environmental profiling. The process is usually initiated with the organization of basic information about a country gleaned from existing US data sources. This first phase of the profiling process is intended principally to assist the AID Mission personnel in initiating a dialogue with host country officials on the environmental situation and needs of their country. It is a starting point. Together, the AID Mission and host country reach conclusions as to whether more in-depth examinations are appropriate and if so, how they should be carried out, funded and used. To date, 47 initial profiles have been completed (See Appendix D) and 12 more in-depth ones have been either completed or are underway. In some countries, the decision may be reached that either no further analysis is necessary because of the adequate understanding existing within the government (Indonesia) or comparable studies are underway (Kenya) that can have the same ultimate goal.

The 12 in-depth profiles have been carried out in a variety of ways not evident from the table:

-- In Mauritania, further understanding was achieved through the use of a traveling workshop conducted for senior government officials by a select team from the National Academy of Science. The problems and potential corrective actions were identified throughout the one week workshop and in subsequent studies.

-- In the Dominican Republic, AID and country officials prepared a report containing findings and recommendations suitable for circulation to the donor community. The findings of the Profile now appear regularly in local nowspapers and the first printing of 200 copies of the Spanish version has long been sold out. Orders for the next printing already exceed the number in circulation. Similar high levels of interest have been generated by the Environmental Profile in Honduras.

-- In Ecuador, an effort has been undertaken by a local P.V.O., Fundacion Natura, on behalf of the governmnt and AID. This organization has also been instrumental in bringing environmental problems to the attention of the government and the public.

-- In Turkey, a private non-profit and non-governmental organization, Environmental Problems Foundation of Turkey, has carried out over a period of one year, a study of environmental problems unlike any previously. It constitutes a basic point of departure for further studies on environmental topics as well as for individuals or groups interested in the environment or engaged in research or analysis on Turkey's environmental problems. The report is available in both English and Turkish.

Without question, the profiling process has have been very useful in defining opportunities for AID. This is exemplified by a project on "Natural Resource Management" in the Dominican Republic. This project recognizes the alarming rate of deterioration of the natural resource base identified in the environmental profile. The erosion rates per hectare in most of the nation's watersheds are estimated to average 300 metric tons per year. This massive destruction of the watershed areas is exhibited throughout the country. The project will improve the institutional ability of the government to survey, plan and implement activities related to natural resource concerns. The program will contain an environmental education program and a major component addressing soil and water conservation.

Other donors, being advised of AID efforts and environmental profiling, have requested copies of profiles for countries to which they provide assistance. It is expected that this sharing of information will eventually lead to cooperation in addressing the natural resource problems of individual countries. The usefulness of the Environmental Profiles can also be illustrated by the decision of a major commercial publishing firm to print and sell the documents to Universities, researchers and others with an interest in basic natural resource information of assisted countries.

Program Growth

In 1977, an attempt was undertaken to define the extent of AID's involvement in natural resource activities as authorized in the various sections of the Foreign Assistance Act. A nine-part definition of activities (See appendix E) considered appropriate to this area of assistance was developed. Individual activities and programs of AID were then examined to determine what percentage or actual funds of each was directed in part or total toward any of these nine categories of assistance. The figures for fiscal FY 1978 through the level requested for FY 1983 on the four most relevant categories are shown below:

FUNDING FOR PROJECTS OR PROJECT COMPONENTS CONCERNING FORESTRY, NATURAL RESOURCES AND ENVIRONMENT
($000)

All Bureau Total	FY 78 ACTUAL	FY 79 ACTUAL	FY 80 ACTUAL	FY 81 ACTUAL	FY 82 ESTIMATE	FY 83 REQUEST
Institutional Building	620	10,319	13,412	21,477	65,958	63,795
Information/Education	250	3,840	3,016	6,017	3,672	1,590
Conservation/Land Management	10,435	39,015	61,523	54,685	33,188	36,333
Vegetative Cover:	1,790	18,229	31,703	32,943	36,659	50,738
Totals	13,095	71,403	109,654	115,222	139,477	152,456

Because of the manner in which the tables have been generated and the differing years over which individual projects are conducted, strict comparison of dollar amounts between years is inappropriate. What is apparent, however, is the increasing recognition of the relationship of forestry, environment and natural resources to the development process as evidenced by the significant increases since FY 1978. It is important to note that these activities have been funded from almost all of AID's appropriation accounts thus demonstrating the recognition that environmental and natural resource issues are closely linked to other development priorities--agricultural, health, education, selected development activities, economic support fund, etc.

Natural Resource Specialists

Professional support to the Agency comes from a mix of full time professional staff and a variety of supporting service arrangements. Appendix F identifies the principal full-time positions in the field and geographical bureaus of Agency. Elsewhere in Washington, natural resource expertise is located in the Bureau of Science and Technology (Offices of Forestry and Natural Resources, Agriculture, Engineering and Rural Development) and the Bureau for Program and Policy Coordination.

A variety of supporting service arrangements have also been established to provide assistance to AID and LDC governments. Included are:

-- Three Indefinite Quantity Contractors primarily engaged for preparation of environmental assessments and environmental profiles.

-- Man and the Biosphere (MAB) National Committee Network which reviews and manages activities on specific environmental problems responsive to AID and LDC needs. Projects bring US and LDC experts together for training on such problems as tropical forests, biosphere reserves, grazing lands, watershed management and coastal resources.

-- National Park Service (NPS) - A project entitled "Environment and Natural Resources: Expanded Information Base" is reviewing, summarizing and disseminating environmental information useful to AID and LDCs. Review papers and case studies are underway which will result in project design guidelines for different geographical zones such as the humid tropics, arid and semi-arid lands, grass and range lands and coastal areas.

-- USDA; Forest Service RSSA which established a Forestry Support Program (FSP) to provide AID with close working cooperation with the professional forestry and natural resources community. FSP permits tapping into the best technical expertise of both domestic and overseas universities, agencies, institutes and other organizations.

-- Consortium for Integrated Crop Protection (CICCP) - This program of assistance includes eight universities and the U.S. Department of Agriculture. In addition to providing training in pest management and the agro-medical approach to pesticide use, the consortium makes available expertise to USAID missions for the design of agricultural projects which include elements of crop protection. Assistance is provided in such diverse areas as pesticide regulations, selection, packaging, use and disposal of pesticides and the introduction of techniques of integrated crop protection. Some examples of the work of the consortium include the following:

- Somalia assistance in revising pesticide laws, establishing worker protection safety, disposal of outdated and banned pesticides, and preparation of three environmental assessments for agricultural projects.

- Locust Control - Supplied aerial dispersal expert to assist east African desert locust control organization in evaluating future aerial control methodologies.

Peru - conferred with numerous organizations concerning establishment of a broad-based, national integrated pest-management program.

Training - In addition to numerous country specific and regional courses, the project will conduct two upcoming "Train the Trainer" courses in the Caribbean. One will be concerned with recognition of treatment of pesticide poisoning (eastern Caribbean) and one in Paraguay for ultimate dissemination to LDC farmers.

— Joint Environmental Services - A new arrangement is under consideration which would draw upon worldwide expertise of the International Union for the Conservation of Nature and Natural Resources (IUCN) and the International Institute of Environment and Development (IIED). This service would bring to AID and LDC's, expertise not likely to be available from traditional US Government arrangements. Consultancies already requested by AID Missions include such diverse areas as: legislative drafting, coastal resource management, park and reserve management, and fisheries management.

Private Sector

-- A pilot program is under development that will take advantage of the expertise in US corporations willing to assist developing countries with problems of industrial pollution.

Under the program being piloted first in Tunisia and Jordan, teams of US corporate advisors will consult with Government and industry personnel on the pollution problems from the more serious industrial sectors as identified by the host government. Recommendations will be made for improvements based on broad expertise of the corporate advisors but tailored to the realities of the local economic and political situation. This program has the potential for expanding to other countries and for addressing needs beyond pollution control and beyond the in-house capabilities of AID personnel.

-- Discussions are underway for improved cooperation between AID and US manufacturers of pesticides and agricultural chemicals. A program of cooperation is being explored around training for pesticide selection, use and disposal. The emerging problems in some countries with the proper disposal of deteriorating stocks of improperly stored chemicals will also be the focus of a cooperating arrangement.

Forestry--Program Status and Support Activities

As noted earlier, AID's projects concerned with the loss of vegetative cover have been increasing steadily just as has the Congressional concern evidenced by the modifications to the

Foreign Assistance Act. In February of this year, we prepared a comprehensive report on our forestry activities at the request of the House Appropriations Committee. The report emphasized activities related to tree planting, but in keeping with the Agency policy the report also discussed efforts to assist developing countries to improve their capacity for making sound forestry and natural resource decisions. Important tables from the Report included in Appendix G. Highlights of this report include:

-- AID is currently supporting 67 bilateral assistance projects in 30 countries plus five centrally funded activities which deal exclusively or in part with forestry-related problems.

-- These 72 forestry-related projects have a life of project (LOP) cost totalling $542 million. 24 percent ($136 million) of the total LOP costs of these projects is actually devoted to forestry activities. Only $36 million of this is devoted to direct, on-the-ground tree planting worldwide. The majority of AID-effort is being directed toward various forms of forestry capacity building including training, technical assistance, research, infra-structure/administration, and special studies/analyses.

-- With the ongoing forest-related projects, AID is expected to accomplish 21,992 hectares of tree planting paid for predominantly with AID funds. 84,059 hectares will be substantially cost-shared with host countries and another 52,672 hectares of planting will be done by host country organizations utilizing capabilities strengthened by AID efforts. This would constitute a worldwide total of 158,723 hectares of on-the-ground tree planting as a result of AID investments.

-- At the end of FY 1981, at least 13,000 hectares have been planted with more than 18 million trees with ongoing forestry projects in 20 countries. This includes five Asian, eight African and seven Latin American countries.

-- More than half of all tree planting that is taking place worldwide under US foreign assistance programs is actually being accomplished under the PL 480 program.

Structured programs of cooperation in the area of forestry have been established with the Peace Corps, the Food and Agricultural Organization and the Cooperation for Development in Africa group of donors.

-- The Peace Corps cooperative activities are intended to develop better qualified forestry volunteers and host-country counterparts in countries where AID and the Peace Corps are already implementing joint programs. The Peace Corps has carried out a series of 25 country needs analyses as a basis for country programming. Training materials have been developed for two countries in which expanded forestry programs are planned; 20 volunteers have been trained with materials to work on forest projects in Ecuador and 11 more have been trained for Paraguay. In addition to forestry problems, the Peace Corps has assigned volunteers to work on a wide range of AID projects. In Niger for example, Peace Corps Volunteers have assisted in seven projects, ranging from Forestry and Land use planning to a survey of marshlands.

-- Regional forestry workshops involving the Peace Corps, AID, and host-country participants have been held in Costa Rica and the Philippines. Two activities which are currently being implemented include the "Regional Fuelwood Project" in Central America and the "Natural Resources Management Project" in Honduras. Six Peace Corps volunteers have been assigned to each project.

-- Two agreements have been signed with the FAO to facilitate AID utilization of FAO expertise in forestry and other disciplines. The first provides a grant to provide a forester for one year to assess the forestry situation in the Sahel and to identify potential second generation efforts which donors might support. A second grant is designed to be responsive to requests for assistance from the rest of sub-Saharan Africa.

The following are illustrative of recent forestry-related activities supported by AID:

-- In Niger, through the Forest Land Use Planning project, AID is helping to establish a functional planning and managerial capability within the Ministry of Rural Development and to prepare a long-term perspective plan for the rehabilitation, conservation and protection of the country's soils and natural vegetation.

-- In Sri Lanka, the reforestation and watershed management project provides technical assistance for the restoration of 50,000 acres for watershed stabilization and fuelwood. An institutional development component includes a forestry extension program and a forest department training program for midle level staff.

-- A successful $25 million ongoing social forestry project developed with villages in Madyha Pradesh, India for the planting of trees on marginal lands is leading to a second similar project in the State of Maharastra. This project is planned for FY 1983.

-- In Haiti it has been difficult to establish a sizeable program in reforestation, due in part to the over-complexity of projects as well as inaction by the Governmentof Haiti. A number of small pilot activities in reforestation have been funded. Most notable was assistance to the Levy Farm-nursery under the Agricultural Development Support Project. Approximately 200,000 trees were out-planted around the nursery. This project additionally set up four village-level nurseries from which approximately 80,000-88,000 trees were out-planted over a two year period.

Another project assisted in establishing the Nan Vincent Nursery in the northwest which planted thousands of trees and carried out important species trials and soil surveys in the watershed area.

AID's current efforts in Haiti are directed at ameliorating the problem of environmental degradation through reforestation and agro-forestry. The two main programs are the soil conservation component of the Integrated Agricultural Development Project (IADP) and the Agro-Forestry Outreach project.

- The soil conservation component of the IADP is aimed at watershed reforestation, forestry and soil conservation. The emphasis is on training Haitians in conservation and forestry through the actual restoration of degraded watershed slopes under the guidance of USDA Soil Conservation Service personnel.

- The Agro-Forestry Outreach project is oriented toward short- and medium-term field results. It is supported by $8 million in grant financing, almost exclusively through the private sector. The principal components are: (a) an $850,000 grant to a US private voluntary organization, Operation Double-Harvest (ODH), to facilitate tree-farming and experimentation as well as the production and distribution of fast-growing trees; (b) a grant to the Pan American Development Foundation to assist in selecting high impact forestry projects sponsored by various PVOs, community organizations and individuals; (c) a grant to CARE to establish an agro-forestry outreach system; and (d) the establishment of a central support team for the project. The Operation Double-Harvest component has been the most active to-date. With grant negotiations completed in March 1981, 87,000 lucaena trees were out-planted by May with an additional 50,000 trees transplanted during September and October in 1981. This planting involved five species of trees. In addition, 50,000 lucaena seedlings were sold at subsidized costs to the private sector and were subsequently out-planted. Expansion of the ODH Nursery is under way and the goal has been set for a cumulative total of out-planting of one million trees before the end of FY 1982.

We view this record as being quite impressive when measured against the difficulties of development assistance to Haiti. It should be noted that if the trend toward ecological disaster in Haiti is to be reversed, it will require the commitment of the Haitian government and people. AID and other donors can continue to work with the public and private sectors to demonstrate what can be done and to facilitate constructive progress but it will take the emergence of a genuine national commitment to overcome years of neglect.

Coordination with Other Donors

In 1978, the International Institute for Environment and Development (IIED) undertook a study of the environmental policies, procedures, and programs of six bilateral assistance agencies (those of Canada, the Federal Republic of Germany, the Netherlands, Sweden, the United Kingdom and the United States). The objectives of the study were to "assess the extent to which policies, procedures and programs of the six bilateral agencies promote sustainable, environmentally sound development; to examine the constraints on improved environmental performance in these agencies; and to recommend changes that might be necessary--and if all possible, to remove, or substantially reduce, these constraints."

The Natural Resources Defense Council (NRDC) was selected to conduct the evaluation of AID. The NRDC study was conducted over an eighteen month period and focussed on activities in the areas of forestry, soils, energy and pesticide management. Visits were made to six Missions to evaluate the effectiveness of AID procedures and directives.

The opening statement to the final report states: "Within the last decade, the U.S. Agency for International Development

(AID) has changed from an agency which paid little conscious attention to environmental aspects of development into a leader within the international development assistance community in addressing the serious environmental problems confronting developing countries. AID is moving toward a program of assistance which is sensitive to the relationship between environment and development, and responsive to the needs of developing nations for assistance in protecting and managing critical natural resources."

The report did include numerous recommendations, the majority of which we believe have been essentially satisfied. One set of recommendations in particular dealt with the coordination of other donors. It identified three actions that were suggested be completed by 1980. These included:

"1. Take the initiative in getting other bilateral development agencies to commit themselves publicly to:

(a) assuring environmental soundness of their development assistance projects and

(b) giving higher priority for financing environmental and natural resource projects.

"2. Request that the OECD Development Assistance Committee meet to establish as common goals the objectives set out in 1.

"3. Sponsor a series of donor-host country meetings on fuelwood, agroforestry, and soil and water conservation aimed at the exchange of experiences and at eliciting donor decisions to devote more resources to these areas."

AID has taken the initiative and attempted to work with the other bilateral donors to encourage their assistance programs to follow a similar pattern of concern for environmental consequences. On several occasions, the AID representative to the Development Assistance Committee (DAC) of OECD had encouraged the inclusion of environment and development as a subject on the DAC agenda. Lacking a positive response and an expressed concern of several governments over the formation of another official correspondence group under the auspices of the DAC, AID undertook to initiate informal correspondence with principal environmental officers or others within each of the OECD bilateral agencies. The materials shared in correspondence have ranged from policy statements to copies of environmental profiles. At the last high-level meeting of the DAC, the dates of April 19 and 20, 1982 were established for a meeting on the subject of environment and development. This was at the suggestion of the representative from the Netherlands.

AID has also expressed willingness to discuss further, a draft Declaration of Environmental Principles prepared by the

UNEP for consideration by bilateral donors. The draft Declaration is similar to that signed by regional development agencies in 1980.

AID has taken the initiative of bringing donor organizations together to discuss coordinated approaches to such problems as forestry, fuelwood and energy. Most notably this has been done in Africa and Asia. Next month for example, in Bangadore, India, AID will bring Asian forestry experts and other donor representatives together for a workshop entitled "Forestry and Development". A FY 1983 project on Watershed Management is planned with the ASEAN countries of the Philippines, Thailand, Indonesia and Malaysia.

Another approach to the providing of appropriate natural resource assistance is taking shape in east Africa. Through the Regional Economic Development Services Office located in Nairobi, a Natural Resources unit is being formed that will assist countries and AID missions in addressing a full range of natural resources problems in a systematic and integrated way. The sector analysis approach being pursued is expected to accomplish the following goals:

(1) Provide better and necessary information for host-country and mission planning and decision-making;

(2) Strengthen host-country institutional capability in: monitoring, data collection, data processing, analysis, policy formulation, and management of natural resources;

(3) Identify priority corrective measures and help the host-country implement and evaluate the identified interventions.

This activity will be evaluated to determine its appropriateness to other regional areas.

SUMMATION

The period of adjustment to the recognition that environment and natural resources issues are a relevant element of sustainable development assistance is now behind AID. This is not the case in the majority of other donor organizations which still have negative reactions to any formal environmental review process or toward projects which are not directly involved with enhancing food production, available water resources or other traditional assistance activities. In AID, a full range of support toward natural resources is already in place and attention is being more carefully focused on improvements in the institutional capacity of governments to manage their development and on finding ways of utilizing the vast experience of the U.S. Government and private sector in support of the developing countries.

AID can be expected, therefore, to continue to provide support for projects which help improve life in the developing countries, either directly such as the provision of water supplies or more indirectly as in addressing the causes and results of soil erosion, flooding, loss of traditional fuels, etc. AID can also be expected to continue to encourage other donors to adopt an approach to development assistance that recognizes the importance of addressing the complex interactions in the management of natural resources for sustainable growth. Beyond encouragement, AID will continue to offer to cooperate with and assist other donors in achieving such objectives and program realities. To the extent possible, AID will propose new mechanisms of donor cooperation with developing countries in the examination and prioritization of development needs. Bilateral efforts will whenever possible, be directed to support regionally developed action plans.

APPENDIX A

- List of Some Key Governmental Institutions with Environmental Responsibility in Developing Countries

AFRICA

COUNTRY	KEY INSTITUTION(S)
Algeria	Ministere de L'Hydraulique, de Mise en Valeur des Terres et de la Protection de L'Environment
Benin	Commission Nationale de L'Environment; Ministry of Rural Development and Cooperation
Botswana	Mininstry of Mineral Resources and Water Affairs; Ministry of Local Government and Lands, Ministry of Agriculture; Ministry of Health
Central African Republic	Ministry of Agriculture, Water, Forests, Hunting and Fisheries
Chad	Ministere du Developpement Agricole et Pastoral et des Calamites Naturelles
Congo (People's Repulic of)	Ministry of Water and Forests; Ministry of Public Health and Social Affairs
Egypt	Ministry of Agriculture and Land Reclamation; Secretariat for Environmental Research; Minitry of Public Health
Ethiopia	Ministry of Agriculture; Ministry of Mines, Ener[illegible] and Water Resources; Ministry of Public Health
Gabon	Ministry of Environment; Ministry of Agriculture
Ghana	Environmental Protection Council; Ministry of Lands and Natural Resouces; Ministry of Health

AFRICA cont'd.

Guinea	Ministry of Forests and Fisheries
Ivory Coast	National Commission on the Environment; Ministry of Planning
Kenya	National Environment Secretariat; Ministry of Environment and Natural Resources
Liberia	Ministry of Local Government, Rural Development and Urban Reconstruction; Ministry of Health and Welfare
Malawi	Secretariat for Agriculture and Natural Resources
Mali	Ministry of Development (Division of Water and Forests); Ministry of Agriculture
Niger	Ministry of Rural Development; Ministry of Public Health and Social Affairs
Nigeria	Ministry of Housing and Environment
Senegal	National Commission on the Environment; Ministry of Industrial Development and the Environment; Ministry of Rural Development
Sierra Leone	Ministry of Agriculture and Forestry
Sudan	Ministry of Agriculture, Food and Natural Resources; National Committee on the Environment; Ministry of Health
Swaziland	Ministry of Agriculture
Togo	Ministry of Health; Ministry of Rural Economy (Water and Forests Service)
Tunisia	Ministere de l'Agriculture

AFRICA cont'd.

Zaire	Departement de l'Environment, Conservation de la Nature et Tourisme
Zambia	Ministry of Lands and Natural Resources
Zimbabwe	Ministry of Natural Resources and Water Development

ASIA AND THE PACIFIC

Bangladesh	Environmental Pollution Control Board
Burma	Ministry of Health
China (People's Republic of)	Office of Environmental Protection
Fiji	Ministry of Urban Development, Housing and Social Welfare
India	Department of Environment
Indonesia	Ministry of Development and Supervision of the Environment
Korea (South Republic of)	Office of Environment; Ministry of Agriculture and Forestry; Ministry of Health and Social Welfare
Malaysia	Ministry of Science, Technology and Environment; Ministry of Primary Industries (Forestry and Mines Departments); Ministry of Agriculture
Nepal	Ministry of Food, Agriculture and Irrigation; Ministry of Forests; Ministry of Land Reform; Ministry of Public Works and Transport; Ministry of Water and Power

ASIA AND THE PACIFIC cont'd.

Philippines	National Environmental Protection Council; National Pollution Control Commission; Ministry of Agriculture; Ministry of Human Settlements and Ecology; Ministry of Natural Resources; Ministry of Local Government and Community Development
Singapore	Ministry of the Environment
Sri Lanka	Department of Environment; Ministry of Land and Land Development; Ministry of Agricultural Development and Research; Ministry of Local Government, Housing and Construction
Thailand	National Environment Board

LATIN AMERICA AND THE CARIBBEAN

Argentina	Subsecretaria de Planeamiento Ambiental
Bahamas	Ministry of Agriculture, Fisheries and Local Government
Barbados	Ministry of Health and Welfare
Bolivia	Department of Natural Resources and Environmental Protection (Ministry of Planning and Coordination); Centro de Desarrollo Forestal (CDF), Ministry of Rural Affairs and Agriculture; Ministry of Social Welfare and Public Health
Brazil	Special Secretariat for the Environment
Colombia	Instituto de Desarollo, Recursos Naturales y del Ambiente (INDERENA)
Ecuador	Ministeriode Recursos Naturales y Energeticos; Ministario de Agriculture y Ganaderia; Ministry of Public Health
Grenada	Department of Planning, Development and Training (Prime Minister's Office)

LATIN AMERICA AND THE CARIBBEAN, cont'd.

Guatemala	Ministerial Commission for Conservation and Improvement of the Human Environment; Ministry of Agriculture; Ministry of Public Health and Social Assistance; Ministry of Public Works and Communications
Guyana	Ministry of Economic Development (Development Secretariat)
Haiti	Division de l'Amenagement du Territoire et de l'Environnement, Department of Agriculture, Natural Resources and Rural Development (DARNDR); National Council on Environment and Erosion Control (CONAELE); Department of Public Health and Population
Honduras	Ministry of Natural Resources
Jamaica	Ministry of Mining and Natural Resources
Mexico	Undersecretariat for Environmental Improvement (Federal Health Secretariat)
Panama	Ministerio de Planification y Politica Economica
Peru	National Office for Evaluation of Natural Resources (Prime Minister's Office); Ministry of Agriculture and Food; Ministry of Health; Ministry of Housing and Construction (ONERN)
Trinidad and Tobago	Ministry of Planning and Development
Uruguay	Instituto Nacional Para la Preservacion del Medio Ambiente
Venezuela	Ministry of Environment and Renewable Natural Resources (MARNR)

NEAR EAST AND THE MIDDLE EAST

Bahrain	Ministry of Planning
Cyprus	Ministry of Agriculture and Natural Resources
Iran	Department of Environment
Jordan	Council for Human Environment Affairs; Ministry of Agriculture; Ministry of Interior for Municipal and Rural Affairs; Ministry of Tourism and Antiquities; Ministry of Health
Kuwait	Ministry of Planning, General Department of Technical Cooperation
Lebanon	Ministry of Public Health, Agriculture, Cooperatives and Housing
Malta	Ministry of Health and Environment
Oman	Council for Conservation of Environment and Prevention of Pollution
Qatar	Ministry of Industry and Agriculture
Saudi Arabia	Ministry of Municipal and Rural Affairs (Directorate-General of Environmental Health)
Syrian Arab Republic	Ministry of State for Planning
Turkey	Undersecretariat for Environmental Affairs (Prime Minister's Department)
United Arab Emirates	Ministry of Agriculture and Fisheries

Sources: Center for International Environment Information, "Government Agencies with Environmental Responsibilities in Developing Countries", April 15, 1980: Dorm-Adzobu, Clement, "Environmental Problems and Management Policies in Tropical Africa", Berlin, 1981; Various U.S. AID/MAB Country Environmental Profiles; World Environment Report.

APPENDIX B

RECENT AMENDMENTS TO THE FOREIGN ASSISTANCE ACT OF 1961(FAA) MANDATING EXPANDED FORESTRY AND RELATED NATURAL RESOURCES ASSISTANCE

1977 Amendments

The 1977 Amendments to the Foreign Assistance Act of 1961 (FAA) contained a new section, Section 118, which called upon A.I.D. to:

> "Furnish assistance...for developing and strengthening the capacity of less developed countries to protect and manage their environment and natural resources. Special efforts shall be made to maintain and where possible restore the land, vegetation, water, wildlife, and other resources upon which depend economic growth and well-being, especially that of the poor."

1978 Amendments

The 1978 Amendments to the FAA changed the general development assistance policy statement in Section 102 include reference to environment and natural resources as a "critical problem" area:

> "United States development assistance should focus on critical problems in those functional sectors which affect the lives of the majority of the people in the developing countries; food production and nutrition; rural development and generation of gainful employment; population planning and health; environment and natural resources; and education, development administration, and human resources development."

Section 103 of the FAA was amended in 1978 to include specific reference to forestry and soil conservation:

> "Assistance...shall be used primarily for activities which are specifically designed to increase the productivity and income of the rural poor, through such means as...stimulation of small, labor intensive enterprises in rural towns; improvement of marketing facilities and systems; expansion of rural infrastructure and utilities such as farm-to-market roads, water management systems, land improvement, energy, and storage facilities; establishment of more equitable and more secure land tenure arrangements; and creation and strengthening of

> systems to provide other services and supplies needed by farmers, such as extension, research, training, fertilizer, water, forestry, soil conservation, and improved seed, in ways which assure access to them by small farmers."

Section 118 was expanded by the 1978 Amendments to include a call for environmental assessments of development assistance efforts and evaluations of developing country environmental and natural resource problems and capabilities for solving them:

> "In carrying out programs under this chapter, the President shall take into consideration the environmental consequences of development actions.
>
> "In furtherance of the purposes of this section, the President shall carry out studies to identify the major environment and natural resource problems, and the institutional capabilities to solve those problems, which exist in developing countries. The results of these studies shall be reported to the Congress by March 1, 1979."

The 1978 Amendments to the FAA also called upon A.I.D. under Section 119 to become involved with fuelwood and other renewable energy sources:

> "Furnish assistance... for cooperative programs with developing countries in energy production and conservation, with particular emphasis on programs in research and development, and use of small-scale, decentralized, renewable energy sources for rural areas carried out as integral parts of rural development efforts in accordance with Section 103..."

1979 Amendments

Cooperative programs with developing countries in energy production and conservation were further authorized under the 1979 amendments to Section 119 to:

> "...include research on, and the development, demonstration, and application of suitable energy technologies (including use of wood); analysis of energy uses, needs, and resources; training and institutional development; and scientific interchange."

Section 119 dealing with Renewable and Unconventional Energy Technologies was further expanded by the 1979 Amendments to the FAA by adding the following:

> "Inadequate access by the poor to energy sources as well as the prospect of depleted fossil fuel reserves and higher energy prices require an enhanced effort to expand the energy resources of developing countries, primarily through greater emphasis on renewable sources. Renewable and decentralized energy technologies have particular applicability for the poor, especially in rural areas."

The 1979 Amendments to FAA also contained under Section 103(b), the most explicit authorization language in the history of U.S. foreign assistance legislation for providing bilateral assistance to deal with forest resource depletion and associated soil and water resource deterioration:

> "The Congress recognizes that the accelerating loss of forests and tree cover in developing countries undermines and offsets efforts to improve agricultural production and nutrition and otherwise to meet the basic human needs of the poor. Deforestation results in increased flooding, reduction in water supply for agricultural capacity, loss of firewood and needed wood products, and loss of valuable plants and animals. In order to maintain and increase forest resources, the President is authorized to provide assistance under this section for forestry projects which are essential to fulfill the fundamental purposes of this section. Emphasis shall be given to community woodlots, agroforestry, reforestation, protection of watershed forests, and more effective forest management."

(1980: Continuing Resolution passed)
1981 Amendments

The act contains a statement of Congressional concern for the current trend towards degradation of natural resources and the environment in developing countries. Particular concern is expressed for the continuing destruction of tropical forests. Assistance is authorized to develop and strengthen the capacity of developing countries to protect and manage their environment and natural resources. Subject to procedures the President considers appropriate, AID is required to prepare and take into account an environmental impact statement for any program significantly affecting the environment of the global commons, and an environmental assessment for any program significantly affecting the environment of any foreign country.

"The Congress finds that if current trends in the degradation of natural resources in developing countries continue, they will severely undermine the best efforts to meet basic human needs, to achieve sustained economic growth, and to prevent international tension and conflict.

The Congress also finds that the world faces enormous, urgent, and complex problems, with respect to natural resources, which require new forms of cooperation between the United States and developing countries to prevent such problems from becoming unmanageable. It is, therefore, in the economic and security interests of the United States to provide leadership both in thoroughly reassessing policies relating to natural resources and the environment, and in cooperating extensively with developing countries in order to achieve environmentally sound development."

"In order to address the serious problems described, the President is authorized to furnish assistance under this part for developing and strengthening the capacity of developing countries to protect and manage their environment and natural resources. Special efforts shall be made to maintain and where possible to restore the land, vegetation, water, wildlife, and other resources upon which depend economic growth and human wellbeing, especially of the poor."

"The President, in implementing programs and projects under this chapter, shall take fully into account the impact of such programs and projects upon the environment and natural resources of developing countries. Subject to such procedures as the President considers appropriate, the President shall require all agencies and officials responsible for programs or projects under this chapter - "(A) to prepare and take fully into account an environmental impact statement for any program or project under this chapter significantly affecting the environment of the global commons outside the jurisdiction of any country, the environment of the United States, or other aspects of the environment which the President may specify; and "(B) to prepare and take fully into account an environmental assessment of any proposed program or project under this chapter significantly affecting the environment of any foreign country. Such agencies and officials should, where appropriate, use local technical resources in preparing environmental impact statements and environmental assessments pursuant to this subsection."

"The Congress is particularly concerned about the continuing and accelerating alteration, destruction, and loss of tropical forests in developing countries. Tropical forests constitute a major world resource. Their destruction and loss pose a serious threat to development and the environment in developing countries. Tropical forest destruction and loss result in shortages of wood, especially wood for fuel; siltation of lakes, reservoirs and irrigation systems; floods; destruction of indigenous peoples; extinction of plant and animal species; reduced capacity for food production; and loss of genetic resources; and can result in desertification and in destabilization of the earth's climate. Properly managed tropical forests provide a sustained source of fiber and other commodities essential to the economic growth of developing countries."

"The concerns expressed in paragraph (1) and the recommendations of the United States Interagency Task Force on Tropical Forests shall be considered by the President - "(A) in formulating and carrying out programs and policies with respect to developing countries, including those relating to bilateral and mlultilateral assistance and those relating to private sector activities, and "(B) in seeking opportunities to coordinate public and private development and investment activities which affect forests in developing countries. "(3) It is the sense of the Congress that the President should instruct the representatives of the United States to the United Nations and to other appropriate international organizations to urge - "(A) that higher priority be given in the programs of these organizations to the problems of tropical forest alteration and loss, and "(B) that there be improved cooperation and coordination among these organizations with respect to tropical forest activities."

APPENDIX C

AID ENVIRONMENT AND NATURAL RESOURCE POLICIES

The following AID Policy Determinations set the framework for all the natural resources activities of the Agency:

-- Policy Determination (PD) 51 (Selected Aspects of Science and Technology, 1973) recognizes that improved LDC capabilities for assessing the location and nature of natural resources and for determining how these resources can best be managed is of great importance for development. It guides AID's attention to determining faster, cheaper and more effective techniques for identifying and appraising natural resources as well as to improving techniques for managing natural resource development, including integrated land use-planning, renewable resources and pollution abatement and control.

-- PD 63 (Environmental Aspects of Development Assistance, 1975) directs AID to assist in strengthening the indigenous capabilities of developing countries to appreciate and evaluate the potential environmental effects of proposed development strategies and projects and to select, implement and manage effective environmental protection measures. It also directs that the environmental consequences of proposed AID-financed activities be identified and considered by AID in collaboration with the host country prior to the final decision to proceed, and that appropriate environmental safeguards be adopted.

-- PD 74 (Forestry Programs and Policies, 1981) signals the importance of forestry in developing countries and the need for forestry programs. It establishes that AID is prepared to offer support to developing countries to assist them in addressing the broad range of problems associated with deforestation. Recognizing that the task will require resources beyond the capacity of AID to provide, it directs that AID's bilateral assistance be associated with the mobilization of community and national resources within the host country itself. It also emphasizes that complementary assistance from other donor groups and organizations is important and collaborative opportunities should be explored wherever possible.

-- Policy on Pesticide Support - May 1978 This policy determination provides guidance concerning AID's pest management policy and the promotion of an effective long-term pesticide management program. The Agency recognizes that the proper selection and use of pesticides can contribute to increased agricultural productivity and improved public health. The proper management of pesticide use is also a prerequisite to the development and implementation of integrated pest management programs which avoid the sole reliance upon pesticides by employing a wide range of biological, cultural, mechanical, and chemical techniques to hold pests below damaging economic levels while offering maximum protection to the environment.

-- Energy Assistance Policy Paper - January 1981 AID attaches high priority to energy and intends to increase significantly the total level of funding devoted to energy-related activities in the years to come.

AID's energy programs reflect a recognition of the separate dimensions of the energy problems facing developing countries--dependence on imported oil and inadequate fuelwood supplies to meet growing demand. AID in tailoring programs to individual country requirements and characteristics, consistent with each mission's program objectives and areas where AID programs can act as a catalyst to investment. In addition, as projects are developed, AID will emphasize the importance of energy as a critical factor in achieving AID's development goals in food production, employment, and the environment.

AID programs are expected to concentrate on technical assistance (AID will consider financing capital assistance for fuelwood and small hydropower) in the following areas:

--analysis of needs, uses, resources and policies;
--training and institutional development;
--site testing and demonstration of new technologies;
--increasing energy supplies, both conventional and renewable, but with significant attention to fuelwood activities.

APPENDIX D

September 1981

Summary of Funding
Status of Environmental Profiling

A.I.D. Funding Summary	No.	Initial Reports	No.	AID Funded Equivalent Activities	No.	In-country Studies	No.	Equivalent Activities
AFRICA	18	$82,800	8		2	$ 140,000	6	$700,000
ASIA	8	36,800				–		
LAC	13	59,800			8	605,000		
NE	8	36,800			1	1,000,000	1	53,000
Totals	47	$216,200	8		11	$1,745,000	7	$753,000

Grand Total: $2,714,200

(See attachments for country specific information)

September 1981

STATUS OF ENVIRONMENTAL PROFILING

Country	Initial Report: Completed	Initial Report: In Process	Initial Report: Other	Funding[1]	In Country Study or Other Follow-on Activity: Completed	In Country Study or Other Follow-on Activity: In Process	In Country Study or Other Follow-on Activity: Planned	In Country Study or Other Follow-on Activity: Other	Fundin
AFRICA									
Benin									
Botswana			X[2]					X[2]	
Burundi		X							
Cameroon		X							
Cape Verde	X								
Chad									
Central African Republic									
Congo									
Djibouti			X[2]						
Ethiopia			X[2]						
Gambia	X								
Ghana	X								
Guinea									
Guinea-Bissau									
Kenya			X[2]					X[2]	
Indian Ocean Regional									
Lesotho		X							
Liberia	X								
Malawi			X[2]						
Mali	X								
Mauritania	X							X[3]	
Mozambique									
Niger	X								
Nigeria									
Rwanda	X								
Sao Tome									
Senegal	X								

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[1] Average cost of each "initial report" is $4,600.00 prepared through S&T Bureau contracts with the Library of Congress and the University of Arizona

[2] Africa Bureau contract with Clark University on Environmental Management in Eastern and Southern African countries for equivalent activities (estimated $200,000 cumulative total)

[3] Africa Bureau contract with National Academy of Sciences for Mauritania study ($200,000 estimated)

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BEST DOCUMENT AVAILABLE

STATUS OF ENVIRONMENTAL PROFILING

Country	Initial Report Completed	 In Process	 Other	Funding[1]	In Country Study or Other Follow-on Activity Completed	 In Process	 Planned	 Other	Fundi
AFRICA (contd)									
Sierra Leone									
Somalia			X[2]						
Sudan			X[2]					X[2]	
Swaziland	X							X[4]	
Tanzania			X[2]					X[2]	
Togo									
Uganda		X							
Upper Volta	X					X			65,00
Zaire	X					X			75,00
Zambia		X							
Zimbabwe		X							
(Africa sub-total - 18 initial reports)				(82,800)	(2 profiles)				(140,000
(Africa sub-total - 8 equivalents)				--	(6 equivalent activities)				(700,000
ASIA									
Bangladesh	X								
Burma		X							
India	X								
Indonesia			X[5]						
Nepal	X								
Pakistan		X							
Philippines	X						X		
Sri Lanka	X								
South Pacific			X[6]						
Thailand	X								
(Asia sub-total - 8 initial reports)				(36,800)					

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[4] Africa Bureau contract with Corps of Engineers on Water and Related Land Resources Framework Plan for Swaziland ($300,000 estimated)

[5] Prepared by the IBRD

[6] Prepared by the United Nations Environment [illegible]

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STATUS OF ENVIRONMENTAL PROFILING

Country	Initial Report: Completed	Initial Report: In Process	Initial Report: Other	Funding 1/	In Country Study or Other Follow-on Activity: Completed	In Country Study or Other Follow-on Activity: In Process	In Country Study or Other Follow-on Activity: Planned	In Country Study or Other Follow-on Activity: Other	Funding
LATIN AMERICA & CARIBBEAN									
Barbados		X							
Belize	X								
Bolivia	X				X				58,000
Costa Rica	X						X		55,000
Dominican Republic					X				102,000
Ecuador	X					X			130,000
El Salvador		X							
Guatemala	X					X			88,000
Guyana		X							
Haiti	X								
Honduras	X					X			95,000
Jamaica		X					X		?
Nicaragua	X								
Panama						X			77,000
Paraguay									
Peru	X								
(LAC sub-total - 13 initial reports)				(59,800)		(8 profiles)			(605,000)
NEAR EAST									
Egypt	X						X		
Israel									
Jordan	X								
Lebanon								X 8/	
Morocco	X								
Oman	X								
Portugal									
Syria	X								
Tunisia	X								
Turkey								X 9/	
West Bank/Gaza		X							
Yemen	X								
(NE sub-total - 8 initial reports)				(36,800)		(1 profile) (1 equivalent report)			53,000

1/estimated
8/NE Bureau grant to YMCA
9/NE Bureau grant to Environmental Problems Foundation of Turkey ($53,000)

APPENDIX E

DEFINITIONS OF THE NINE CATEGORIES OF ASSISTANCE

Environment & Natural
Resources

1. Environmental Institution Building

Any activity which builds host country awareness and capibility to deal with environmental questions, for example:

-- Natural Resources Inventories
-- Environmental Policy Legislation
-- Environmental Quality Monitoring
-- Development or Enforcement of Environmental Regulations
-- Land use Planning
-- Remote Sensing Development
-- Research (Agriculture, River Basin, etc.)

2. Information and Education

Any activity which contributes to the environmental knowledge and concern of host country officials and/or the general public, for example:

-- Public Information
-- Environmental Education
-- Environmental Training

3. Vegetative Cover

Any activity which either restores vegetative cover or stops its destruction, for example:

-- Forestry/reforestation/afforestation
-- Watershed Management
-- Reclamation of denuded lands
-- Village woodlot development
-- Renewable Energy (fuelwood plantations)
-- Park Development (enhancement through forestry)
-- Control, mitigation/reversal of desertification

4. Conservation and Land Management

Any activity which protects the fertility of the land and the diversity of plant and animal life, for example:

-- Soil conservation (erosion and sediment control)
-- Range management
-- Coastal Zone Management
-- Fisheries development
-- Integrated pest management
-- Wildlife management and protection

5. Agricultural Water

Any activity which increases the quantity, protects the quality or results in improved usage of agricultural water, for example:

-- Improved Water Management (distribution, usage and drainage)
-- Agricultural Water Supply

6. Drinking Water and Sanitation

Any activity which improves either the quantity or quality of drinking water and/or improves the quality of or limits discharge to acceptable locations, for example:

-- Drinking Water Supply
-- Drinking Water Treatment
-- Small Scale Sewerage Treatment

7. Pollution Control and Abatement

Any activity directed at control of human or industrial Waste Products, for example:

-- Large Scale Sewerage Treatment
-- Solid Waste Disposal
-- Industrial Waste Disposal
-- Air Quality Control
-- Noise Abatement

8. Environmental Health and Disease Control

Any environmentally sound activity directed at the control and elimination of disease vectors such as Malaria, Onchocerciasis, etc., for example:

-- Biological/Integrated Vector Control
-- Biological/Integrated Vector Elimination

9. Other

Any activity which is clearly environmentally related which is not provided for above, for example:

-- Evaluations
-- Feasibility Studies

APPENDIX F

REGIONAL BUREAU AND MISSION FULLTIME ENVIRONMENTAL AND FORESTRY STAFF

Africa	Environmental/Other Advisors	Professional Foresters
AID/W	John Neave (AFR/DR)	Jim Seylor (PSC)
REDSO/EA	John Gaudet (PSC)	Kevin Mullally (RSSA-USFS)
REDSO/WA	Vernita Fort	
Sahel (Mali)		George Taylor
Senegal	Peter Freeman (PSC)	
Somalia	Gary Cohen (IDI)	
CILSS (Ougadougou)	Toby Pierce (PSC)	
Asia		
AID/W	Michael Philley (ASIA/TR)	Kathleen McNamara (ASIA/T
Asia Regional (Indonesia)	William Knowland (PSC)	Deanna Donovan (PASA-USFS Robert Vincent
South Pacific	Robert Kahn (IDI)	
Latin America/Caribbean		
AID/W	Robert Otto (LAC/DR) James Hester	
ROCAP	Frank Zadroga (PSC) Eddie Trujillo (PSC)(Pest Mgt.)	Henry Tschinkel (PASA-USFS
Andean Region (Peru)	(PSC to be selected)	
Near East		
AID/W	Stephen Lintner (NE/PD) (deputy to be filled)	
Egypt	Gus Curly (PASA)	

PSC: Personal Services Contract
IDI: International Development Intern
PASA: Participating Agency Services Agreement

APPENDIX G

Summary of the Forestry Component of AID-supported Forestry-related Projects Authorized as of FY 1981

							Land Area to be Planted		
Region	Number of Projects	LOP Funding (000 $)	Forestry Component (000 $)	Forestry Component as % of LOP Funding	Tree Planting Component (000 $)	Tree Planting Component as % of Forestry Component (and LOP Funding)	Supported Predominantly by AID (hectares)	Supported by both AID and Host Country (hectares)	Supported Predominantly by Host Country Utilizing AID-supported Manpower (hectares)
AFRICA	38	187,136	35,466	19%	6,098	17% (3%)	4,353	7,970	8,075
ASIA	14	208,140	47,548	23%	16,260	34% (8%)	2,825	65,442	43,197
LATIN AMERICA AND THE CARIBBEAN	14	109,790	43,107	39%	13,700	32% (12%)	14,414	10,647	1,400
NEAR EAST	3	32,750	800	2%	400	50% (1%)	400	-	-
WORLDWIDE	6	41,189	9,165	22%	8	- (0%)	-	-	-
GRAND TOTAL	74a/	579,005	136,086	24%	36,466	27% (6%)	21,992	84,069	52,672

Source: Compiled primarily from field missions' responses to AID/Washington request contained in State 311314.

a/ Includes four projects (two in Mauritania and two in Tunisia) which are consolidated and reported as two projects in Table 1 and Annex B.

Source: AID's Bilateral Assistance Program in Forestry and Natural Resources: A Report to the House Appropriations Committee, February 1982

Mr. **Bonker**. Thank you, Mr. McPherson. As usual, you covered the areas very succinctly. I will be wanting to ask you a few questions about how we are going to continue that commitment.

I know your Agency has been environmentally sensitive and that you have attempted to incorporate environmental objectives in many of the bilateral programs, but, of course, the level of that commitment is declining because of budgetary pressures that we are all facing.

I am just wondering, since this is kind of a long-term commitment, whether we are going to realize our earlier investments if we don't continue that financial commitment to the laudable goal of preserving the global environment. We will get back to that in the questioning period.

The third witness on the panel representing the administration this morning is A. Alan Hill, Chairman of the Council on Environmental Quality.

Anyone who has had a chance to look at our commitments in international environmental affairs realizes very quickly that a number of agencies are involved. It kind of reminds one of the international trade issue, where we have bits and pieces all over the administration. In some ways that is good; in other ways it is not so good, because we lack a comprehensive policy and commitment and a great deal of jurisdictional problems and confusion necessarily flow.

We have that same problem in the Congress, especially on the House side where we have so many jurisdictional problems.

We are pleased that you are here. We know that you have a piece of the action and we are anxious to hear from you.

STATEMENT OF A. ALAN HILL, CHAIRMAN, COUNCIL ON ENVIRONMENTAL QUALITY

Mr. **Hill**. Thank you.

Mr. Chairman, I appreciate the opportunity to appear before the subcommittee to share some thoughts about the global environment 10 years after Stockholm.

First let me observe that the Stockholm Conference, as perhaps no other international meeting, sparked the interest and energy of governments, of other institutions, and of individuals around the world. It resulted in the resolve of more than 100 nations to address common, in some cases global, issues of the environment.

What has all this led to?

It is clear from the perspective of a decade of international cooperation on the environment that Stockholm and what may be called the continuing Stockholm process have had a dramatic beneficial impact on world attitudes and approaches to the environment.

Without attempting detailed comments on the implementation of the Stockholm Action Plan, I would note that there has been much progress. This includes the success of individual nations in many areas of concern.

For instance, a recent CEQ report, Environmental Trends, shows that many U.S. rivers have improved water quality and that many U.S. cities have downward trends in levels of air pollutants. We have also seen progress in areas requiring international cooperation. Major gains have been made in controlling commercial whaling. UNEP's regional seas program has had remarkable success. And in this country we are well embarked on cooperative efforts with Canada to resolve our transboundary air quality problems.

As a result of the debate which began during the preparations for Stockholm and which underlay its decisions, the world, developing and developed nations alike, has come to embrace a new view of the environment in which the concepts of economic development and environmental protection are no longer seen in opposition, but as dynamically interrelated and complementary. Sound, sustainable economic development can be the best protector of the environment.

While the Stockholm principles have not been totally acted upon, they have become the basic charter for international action relating to the environment. We still face environmental problems, the worldwide loss of cropland and the reduction in tropical forests, to name only two. We do have the technical knowledge to solve these problems.

Finally, even if we have yet to overcome the serious political and social obstacles which remain, the institutional capability to respond to these problems has been established, not only in the United Nations but in more than 100 national governments, only a handful of which had taken such action a decade ago.

In all this achievement, the United States has played a crucial role. Our own domestic efforts were perhaps the most important motivating force. We have helped to focus world attention on problems as diverse as tropical deforestation and biological diversity, and the effects of toxic chemicals. We were a leader in the creation of a variety of conventions to protect habitat, species, and the global commons.

We supported the creation of the United Nations Environment Programme and have provided major funding. In the 9 calendar years ending December 31, 1981, the United States contributed $75 million, an annual average of 34.5 percent of UNEP's budget. And our Agency for International Development has pioneered in integrating environmental assessment into its assistance programs.

Less than a year ago, at my confirmation hearings before the Senate, I stated that a high priority for the Council on Environmental Quality would be the coordination of White House efforts to address global environmental issues, including some of those raised in the Global 2000 Report to the President, and other recent global studies and reports.

Global 2000 is an important first step to address a number of global issues which have potential impact on U.S. national interests, including national security. It also stresses the need to improve the U.S. national capability to gather data and to forecast future trends.

In order to provide the President with sound policy coordination among the agencies, I have formed an interagency working group on global issues. The Global Issues Work Group provides the administration, through the Cabinet council process, with the collective thinking of senior officials able to take policy level responsibility to recommend appropriate Government action on global environmental issues of national concern.

The working group has held two meetings thus far and has begun working on the formidable tasks in its charge. As we progress, we will suggest mechanisms to improve the quality of the Government's information base, assess and recommend improvements in the ability of the Government to forecast future trends, and provide an optimal basis for long-term policy decisions.

The Global 2000 Report stated, "* * * the analysis shows that the Executive agencies of the U.S. Government are not now capable of presenting the President with internally consistent projections of world trends in population, resources, and the environment for the next two decades."

The working group is in the process of preparing an inventory of all existing U.S. international activities, multilateral and bilateral, pertaining to the environment and natural resources, in order to assess whether the United States is maximizing its resources to best accomplish its international goals. At the present time, there is no comprehensive listing available. We want to assure ourselves that we are neither duplicating efforts nor concentrating too many of our resources in inappropriate arenas. Those issues of most significant dimensions must be accorded priority consideration.

As part of the work group's policy responsibilities, I have undertaken to commit Council resources to provide the work group with an analysis of the strengths and weaknesses of the Global 2000 Report. The preliminary study will be completed by the first week in May. The report will then be circulated to the work group for review and action.

The work group is well into the process of articulating global environmental principles to further the administration's commitment and to guide its policies.

I would like to see some of the following points included:

Environmental policy should be judged by interests of present and future generations of human beings. A healthy environment is fundamental to human well being and to growth and development. Mankind's use of natural resources should be tempered by concern for future generations.

Development necessary for the security and well being of the United States should be sensitive to the environment. With due respect for the values and priorities of other nations, the United States should encourage their pursuit of responsible development and environmental protection.

Careful stewardship of the Earth's natural resources can contribute significantly to sound economic development. Renewable resources should be used in a manner consistent with optimum regeneration. Resources less renewable in the short run should be used as efficiently as is justified by current and expected conditions. Efforts should be encouraged to lessen dependence on nonrenewable resources.

The biological diversity of the planet should be safeguarded by continued exploration of the nature and potential of biological resources, in order to enhance human health and welfare.

When conditions in one country have international environmental effects, all affected nations should participate in investigating the problem and developing solutions.

The most responsible decisions are made by those closest to the people affected by those decisions, and not by entities far removed from the impacts of those decisions. In general, private ownership and free markets are the best institutions to avoid the "tragedy of the commons" and to protect the interests of future generations.

Increased scientific understanding and improved methods for forecasting are needed to address global environmental issues. Ultimately, the resolution of environmental problems which are global in nature is dependent upon cooperation within the international community, as well as research and enterprise by the private sector.

Our work group will meet again in 2 weeks to discuss the documentation for the Nairobi Session of a Special Character and to help develop the U.S. position.

In a statement issued last week to the International Union for Conservation of Nature and Natural Resources, the President has articulated the spirit in which we will be preparing for that important meeting.

The President's message concludes:

> * * * the United States will continue to lend its experience and energies to the universal quest for a higher standard of living and resolution of global issues of transcending importance to all nations, through the sound stewardship of the Earth's resources.

[The full message follows:]

STATEMENT OF PRESIDENT RONALD REAGAN FOR THE INTERNATIONAL UNION FOR CONSERVATION OF NATURE AND NATURAL RESOURCES ON THE VALUE OF INTERNATIONAL COOPERATION IN THE CONSERVATION OF NATURAL RESOURCES

International cooperation in the wise use and conservation of natural resources has become increasingly important as we strive for a better standard of living for all the world. I wish therefore to commend the International Union for Conservation of Nature and Natural Resources for its long, devoted and outstanding efforts in focusing world attention on the vital relationship between conservation and development. Global resources are the ultimate material base for human development as emphasized in the IUCN's "World Conservation Strategy."

The advantages of conservation of rivers and oceans, soils and minerals, forests, grasslands and wildlife, are considerable. The development or improvement of food sources from wild plants and animals, the expended use of renewable materials for fuel, the discovery of new medicines from wild plants, the preservation of biological diversity, and the protection of the global environment are examples of the human benefits derived from good conservation practices. Approaches developed in one country may have direct application in others, such as the concept of national parks, wildlife refuges and other protected areas, which have been pioneered by the United States and are now used throughout the world by countries with widely different development levels and political systems.

The greatest resource that all nations share is people. The emphasis of our cooperation should focus on developing the knowledge and skills that will help individuals and organizations to formulate sounder policies and programs. Skilled people are the cornerstone for building institutions that will ensure the long-term success of our development and natural resource conservation efforts. For this reason, training and continuous voluntary exchange of the newest information and technology must be a central element in our cooperative activities. Training in natural resource management is an important part of our foreign assistance program. Various United States Government agencies and private organizations are involved in sharing their technical expertise through a variety of multilateral and bilateral programs.

You can be assured that the United States will continue to lend its experience and energies to the universal quest for a higher standard of living and resolution of global issues of transcending importance to all nations, through the sound stewardship of the Earth's Resources.

MARCH 1982.

Mr. HILL. I appreciate the opportunity to be here and I am available for questions.

Mr. BONKER. Thank you, Mr. Hill.

I would also like to note that the subcommittee staff has prepared a number of questions which we would like to forward to each of your agencies so we can make the record complete.

Mr. Buckley, I noted earlier your strong personal commitment and intervention in behalf of UNEP, but we are faced now with new and revised budget figures, one for 1982 which would drop the level of funding in terms of U.S. voluntary contributions to that agency from $7.2 to $2 million, and then only $3 million for 1983.

When the Director of UNEP was here, he said that a reduction of that size would be devastating not only in terms of continuing their programs, but psychologically as they are attempting to convene for the 10th anniversary and take a look not only back in terms of the progress that has been made, but more importantly, toward the future.

With such a lack of commitment from the United States, it could really be a psychological setback for those who maintain this commitment on environmental safety. I guess my point is: It is very difficult to extract a definitive response when there is so much going into the budgetary dynamic these days.

Do you think you can manage to keep that personal commitment in such a way that we can keep the funding at reasonable levels in the next couple of years, or would you have to cave in to the Stockman forces?

Mr. BUCKLEY. I try to point out the merits of various programs and the implications for the United States, to the best of my ability. We have to recognize that the entire budget is subject to an extraordinarily deep scrutiny. Each program must be justified, in effect, on a zero base perspective.

As I indicated in my remarks, I believe that UNEP has increasingly gone forward in its role as catalyst and coordinator and is pursuing extremely valuable projects. We continue to have concern over the tendency and the pressures to convert it into, in effect, a development agency, or a funding agency.

Mr. BONKER. Is that your perception of UNEP?

Mr. BUCKLEY. Yes. In fact, there have been a number of projects which tend to bleed out the resources. We believe that by keeping it taut in a fiscal manner, and also by encouraging other countries to come in—since this has been largely a U.S. show with over a third of the contributions—we will not only enlist more countries on a serious basis but, second, we will keep the organization focused on that catalytic idea-generating role which we think is critical to its success.

Mr. BONKER. So I guess your answer is, you are continuing your educational efforts within the administration and they hopefully will be fruitful. It is really hard in Congress these days to restore amounts in the foreign affairs budget when we are experiencing such deep reductions in domestic programs.

But nonetheless, this subcommittee has been committed, although it seems as if we are not considering these various agencies on their merits any more, but only a funding level for all voluntary agencies and then percentage reductions across the board. It is very difficult to set aside UNEP and say this has merits for continuing funding but we are going to have reductions elsewhere.

Mr. **Buckley**. It is a very difficult balancing act. We make our basic contribution to UNEP through our annual assessed contribution to the United Nations. That, of course, has not diminished.

Mr. **Bonker**. I am pleased that you will be heading the delegation. Can you give the subcommittee a preview as to who will be part of our delegation, both officially and in terms of nongovernment organizations?

Mr. **Buckley**. I am afraid that would be premature, but it will reflect, I think, a total interest by this administration in the future success of the organization.

Mr. **Bonker**. You represent the State Department at the highest level, so I imagine that there will be some experts within that Department, but what about some of these other agencies that come into play on global environmental problems?

Mr. **Buckley**. We have, of course, the CEQ.

Mr. **Bonker**. They will be represented.

Mr. **Buckley**. EPA will be represented. We hope to have some very distinguished people from the private groups.

Mr. **Bonker**. So you intend to have good representation from nongovernment organizations.

Mr. **Buckley**. That is right; yes. We hope for a stellar congressional delegation.

Mr. **Bonker**. Don't hold your breath. But if we can't be there, we will have a presence from the Congress. We will have very high-level staff people there at least, so that we are aware of what is going on.

You mentioned earlier the support for the regional seas program, which is one of UNEP's more outstanding achievements. A Caribbean regional seas program is now being developed by UNEP, and to date some 28 countries, including France and the United Kingdom, have pledged $1.5 million to the trust fund that will finance the program. The United States has not yet made a pledge. I think we are being asked for a $500,000 contribution.

You may not be prepared to answer this because, again, this isn't really your area within State, but maybe Mr. McPherson can respond or, I could open the question to anyone who is capable of answering.

That is a very small amount, yet it is one of UNEP's outstanding achievements. It is in a region whose interests are very important to us these days. Is there any reason why we can't make that commitment?

Mr. **Hill**. With regard to the U.S. Government commitment, I had some discussions with people from UNEP with regard to including resources from the private sector. We have several profit-making institutions that have a considerable interest in the Caribbean area, and I have had some general indication of interest in supporting, on a voluntary basis, the regional seas program.

So it is not just what would flow from the Federal Government but also from the private sector.

Mr. **Buckley**. I believe that AID has a number of programs in the Caribbean that are focused on this general issue.

Mr. **McPherson**. Yes. We have a fairly substantial Caribbean area program, about $160 million, life of project costs. This is for a whole range of environmental and natural resource activities.

Mr. **Bonker**. But, you know, the most disturbing conclusion one can reach from your testimony is that in terms of rhetoric I think the commitment is as strong as we have ever seen it, but in terms of actual support by way of financial commitment, by way of policy, it just isn't there.

It is great to say you have programs for an area; we are vast and diverse enough to have programs for almost everything. You get off the hook in that fashion. But the fact is, this is one of UNEP's best programs. The Caribbean is very close to the United States and it is of such vital interest these days. The President has just made an extraordinary statement about our new policy in the Caribbean.

We have France and the United Kingdom making a rather substantial commitment. This isn't a large sum of money. We are proposing to cut UNEP's budget anyway. Why can't we come up with $500,000 to support a program of this importance?

I know you have other programs, they are all valuable, and so forth, but I would like to have a response to this specific commitment.

Mr. **McPherson**. The program that you are referring to is not the same program that Senator Pell was referring to, the Caribbean action plan.

Mr. **Bonker**. Yes, I believe it is.

Mr. **McPherson**. The same thing? Let me tell you just where that is.

We have, in the last 2 weeks, been looking very carefully at the request for U.S. participation. Frankly, there has been a variety of opinions as to whether or not a contribution to the UNEP Action Plan Fund was the most effective approach or way to do this. But I have looked at that as recently as this morning and told Senator Pell, as we sat here chatting, that I would be back to him in a few days with a reaction to it. I will make sure that you get our reaction, too.

It is not a large amount of money, and with the kind of interest that Senator Pell has expressed prior to today, and you this morning, I can assure you that the closest review of it will be made.

Mr. **Bonker**. Thank you, Mr. McPherson. That is probably as close as you can come.

Not only Senator Pell, but Mr. Buckley makes a strong reference to it in his statement.

Mr. **McPherson**. But, you know, in terms of actual commitment to this effort, it seems to me that we really are putting our money into it. We are looking at a growth in the bilateral area from 1978 of $13 million to a projected request from Congress for the 1983 program of $153 million. This is for the range of natural resource matters that we were talking about earlier; that is quite a lot of money. Again, it includes institution building, environmental education and training, conservation, vegetation, forestry kinds of projects, to have that sort of growth is really quite impressive. I can point to no other area of AID programing that has grown anywhere near that dramatically.

Mr. **Bonker**. I am not challenging AID's commitment. I think you have done an extremely good job in developing both sensitivity and commitment to environmental objectives. But I have here an extract from the budget for funding of projects, project components concerning forestry, natural resources and environment, and we have listed some of the totals, including conservation, land management.

In 1980 we actually spent $61,532,000, and that is being dropped in 1982 to $54 million. Our earlier commitment in terms of the long-range budget proposals was $93 million. So we are coming close to cutting that in half. There have been other programs that have experienced some increases, and others reductions.

Now, I know, being a realist, that we can't allow the foreign aid program to be spared from the budget-cutting exercise so prominent on the Hill these days; but nonetheless, I think in your statements you ought to recognize those realities. Otherwise, we have a lot of empty rhetoric that we are doing all these things and believe all these things, yet we don't have the resources to meet those commitments.

Mr. **McPherson**. Being subject, as every agency head is, to the budgetary process, I can certainly fully appreciate your comments about the days of austerity. But I really would like to provide to you in some detail what we have done year by year in this area because the forestry area, as an example, is an area where there has been steady and very substantial growth.

Mr. **Bonker**. I know that. We will get into forestry in a moment.

Mr. **McPherson**. OK.

Mr. **Bonker**. You have emphasized that in your summary statement.

Mr. **McPherson**. It is such a chunk of money, it is important to take a close look at it.

Mr. **Bonker**. You probably know I represent a forestry-producing region of the United States, so I have particular interest in that issue. I made a statement earlier that there has been a lack of both financial and policy support or commitment.

I have seen two articles that appeared recently, one in the New York Times on Sunday, March 28, and a second today. What is really interesting about these articles is that they are covering reports, revelations, if you will, about environmental problems in general, global environmental problems, but the agencies involved in the study were economic agencies, by and large. In other words, their primary focus is on the state of the present and future economies of their regions.

Yet the inescapable conclusion is that environmental degradation is going to have serious economic consequences. That is something that ought to be homemade for the Reagan administration since they do place a strong emphasis on economic growth and economic considerations.

The second, in the Washington Post this morning: "a United Nations study says fast-growing Asia faces major environmental damage." This is a topic being discussed by the United Nations

Economic and Social Commission for Asia and the Pacific. So it is not UNEP or FAO or some other agency primarily involved in environmental issues, but one that is mostly concerned about economic matters.

Yet their conclusion was that ecologically vital tropical forests are disappearing at an alarming rate. Malaysia could lose all of its forests in 12 years, and the Philippines in 14 years and Thailand in 21 years. They go on to talk about farmlands, productivity of farmlands, deterioration of water quality, the seas, and so on and so forth.

The other report, in the New York Times of Sunday, was by the OECD, again, whose primary objective is the state of the global economy, not the environment. What is interesting about this article, and why I raise it at this time is to highlight my earlier statement about a lack of policy support. Mr. Buckley, in your statement, and I don't mean to be rigid or tie you to something, but you did on page 12 list some areas or activities which deserve special emphasis, including modification of the stratospheric ozone layer, acid precipitation, hazardous chemicals, ocean pollution, and so on and so forth.

[The articles follow:]

[From the New York Times, Mar. 28, 1982]

U.S. HOLDS UP REPORT ON GLOBAL ENVIRONMENT [1]

(By Philip Shabecoff)

WASHINGTON, March 27.—The Reagan Administration is withholding approval of a report on the global environment by the Organization for Ecomomic Cooperation and Development because it objects to the report's proposals for governmental action to solve such problems as acid rain.

As a result, publication of the document has been held up since late last year. The O.E.C.D., an organization of the major non-Communist industrial nations, requires approval of all members before publishing a report.

Administration officials said the report, prepared by the Secretariat of the O.E.C.D., is being strongly challenged by the United States Environmental Protection Agency on political, factual and procedural grounds, although other Federal agencies, including the State Department, the Agency for International Development and the Council on Environmental Quality, have found the report acceptable.

The report, classified as restricted by the Government, consists of working papers on such issues as acid rain, hazardous wastes, the effects of carbon dioxide in the atmosphere on climate, global loss of soil and cropland and the need to maintain the world's biological diversity. The report also calls attention to the interdependence of the ecology of nations and the increasingly recognized link between ecological factors and economic development.

The State Department official said that the environmental agency objected to the report on the ground that it did not represent the Reagan Administration's policy on international environmental matters.

"That is a somewhat premature view because the Reagan Administration still does not have an international environmental policy," the official said.

The Administration does, however, have a policy of reducing the use of governmental regulation as a means of protecting the environment. On acid rain, the Government's position is that more research must be done before action is taken. Some authorities say acid rain is killing fresh water life and damaging crops and forests in much of the Northern Hemisphere. The environmental agency has drafted a cable to United States missions in O.E.C.D. countries, but the State Department has not sent it. It complains that the report calls for new laws and enforced compliance procedures to deal with international environmental problems but does not give a role to "market place solutions." The cable also objects to what it says is the report's "preponderant view that industrial progress and economic development lie in opposition to the global environment and the lessening of world poverty and hunger and that solutions are to be sought now in increased international regulation with or without adequate scientific justification."

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Rather, the report seems to state that care of the environment is a requisite for economic development.

Another objection to the report cited in the cable is that it is similar to the "Global 2000 Report," a document published by the Carter Administration describing disturbing environmental and economic trends and their potential consequences. It says recent evidence invalidates many of that report's major assertions, including the finding that many species will be extinct by the end of the century.

However, the President's Council on Environmental Quality is working on follow-up actions suggested by the report. A. Alan Hill, chairman of the council, said he considered the report a "useful document."

Most Administration officials who commented on the report said they believed that Richard Funkhouser, director of international affairs for the environmental agency, had played a key role in blocking the O.E.C.D. report.

[From the Washington Post, Mar. 30, 1982]

U.N. STUDY SAYS FAST-GROWING ASIA FACES MAJOR ENVIRONMENTAL DAMAGE [1]

(By William Branigin)

BANGKOK.—While boasting some of the world's fastest economic development, the countries of Asia face major environmental problems that threaten their future resources, according to a new United Nations report.

The report, issued here recently singled out as the most serious threat the rapid shrinkage of the continent's economically and ecologically vital tropical forests, which it said are "disappearing at an alarming rate." At present rates, the study said, Malaysia could lose all of its forests in 12 years, the Philippines in 14 years and Thailand in 21 years.

Asia's rain forests are regarded as the most productive in the world and are a major basis for economic development in many countries. The report said the reduction in forest areas already had caused such problems as increased seasonal flooding with loss of life and property, water shortages during the dry season, increased erosion of agricultural land and mounting silt deposits in rivers and coastal waters.

Other major environmental problems cited in the study included declining productivity of farmlands, deterioration of water quality in seas and waterways and increasingly serious air pollution in some of the region's largest cities.

These issues are among the topics being discussed at the annual session of the U.N. Economic and Social Commission for Asia and the Pacific, which winds up this weekend. The Bangkok-based commission includes 14 countries bounded by Iran, Mongolia, Japan and the Cook Islands, an area including more than half the world's population.

According to Shah Kibria of Bangladesh, the commission's executive secretary, many of the continent's environmental problems can be traced to poverty. At a recent seminar on environment and development, he noted that of the 2.4 billion population in the commission's region in 1980, about 969 million were classified as below the poverty line. They comprised 84 percent of the world's total poor.

The region's extreme poverty compels many of the poor to over-exploit forests, farmlands and waterways to survive, Kibria said. He called the situation a "vicious circle in which it is difficult to determine whether the actions of the poor lead to environmental damage or whether lower environmental carrying capacity leads to poverty."

As one result, tropical forests are disappearing at a rate of 2 percent a year throughout the region, according to Kibria. He added, "One estimate is that the region will lose 70 percent of its forest cover by the year 2000 unless appropriate longterm measures are taken now."

The U.N. report, the first of its kind, said 378 million people in the area were threatened by man-made and natural processes that turn productive land into deserts. It said large areas of China, India and Iran and parts of Afghanistan and Pakistan were affected by the process.

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[1] Copyright the Washington Post.

Another major problem, according to the study, is a continuing decrease in marine resources such as edible fish at a time when there is a growing need for them. Because of projected population increases and reduced land productivity, it said, the region's annual fish catch of 30 million tons must increase to 54 million tons by the turn of the century to meet protein requirements.

The study also reported these environmental health findings:

Air pollution from automobiles in Bangkok gives the city a carbon monoxide concentration of between 13.9 and 32.4 parts per million, compared to the World Health Organization's standard of 9 ppm. (By contrast, carbon monoxide levels in Washington range between 5 and 20 ppm.)

Air and water pollution in Bombay pose serious health hazards, with an average of 190 tons of sulfur dioxide emitted into the air daily and more than 300 million gallons a day of untreated industrial waste water discharged along the coastline.

Of the 8 million population of Manila and its environs, 75 percent lack potable water and 90 percent of the area's homes are not connected to sewers.

High concentrations of the toxic pesticide DDT were found in water and milk in southern Iran near the Abadan oil refining center, and a U.N. advisory mission was told that bread there was baked with a petroleum derivative that included about 150 chemical compounds, several of which were carcinogenic.

Mr. BONKER. This is an organization that has been looking at, again, the economic consequences of global environmental problems. They have produced a report that has been now supported by your agency, Mr. McPherson, and I believe your agency, Mr. Hill, and still it is being held up by the Environmental Protection Agency, which has a really scant piece of the global environmental picture.

It has become quite a problem in that all member countries must sign off on this report, and of all the agencies in the administration, the one that ought to be the advocate, the real cheerleader for something like this, is objecting and is actually holding up the report.

Mr. Hill, if you are chairman of the global issues work group, you ought to be chagrined by this kind of activity. I would like to ask you to explain the circumstances surrounding this, as the leading figure within the administration. Are you just going to accept EPA's recommendation and let the thing die, or are you going to go to bat for approval of this report? What do you intend to do?

Mr. HILL. I can give you my understanding, Mr. Chairman, because I spoke with Ambassador Funkhouser at EPA yesterday, not long after the reporter who wrote that article called and evidently apologized because his editor cut six paragraphs out of the story. Therein lies many tales.

Mr. BONKER. If we could only get those six paragraphs.

Mr. HILL. Ambassador Funkhouser represented the United States at the OECD Environment Committee meeting in December, at which time the staff proposed adoption of a staff report, and Ambassador Funkhouser objected at that point, stating there had not been sufficient time for the experts and technical people in our Government to react to the report.

That study has been completed. The results have been transmitted to OECD. One of the paragraphs, evidently, in the story said at this point we are all in agreement that the study should be published. It was the earlier draft report that was incorrect. These were experts that were brought in by the Secretariat of the OECD Environment Committee, experts not known to the sponsoring governments.

Now this is going to be on the agenda at the Environment Committee meeting next month, the 20th, 21st, for general discussion. However, I read the same article Sunday and said, "There is something missing here." I have had an explanation. It is satisfactory to me.

Mr. **Bonker**. Can you give any indication as to what the eventual outcome will be?

Mr. **Hill**. The report will be published, of course.

Mr. **Bonker**. And——

Mr. **Hill**. The principles I referred to earlier are what I hope our global issues work group will be able to recommend for administration consideration. Those are mine at this point. There are others on that working group who have some other thoughts. But we are more or less headed in a general philosophic direction which is one that says: We feel that sustainable development is the proper course to solve many of our environmental problems; that a poor country, a country where people are struggling to survive, that is using their forests for things such as fuel wood, a degree of development assistance in resolving that deforestation issue and at the same time raising the level of life in that area. So that is basically the philosophic direction we are going.

Mr. **Bonker**. Mr. Buckley, since you have assumed the educational role, given your political acumen, having been in elective office, it seems to me that these reports—and there are undoubtedly others—stress economic and ecological interdependence. The fact is, unless you have a strong environment it is going to be hard to sustain economic growth over the long period.

Since I represent a forest-producing part of the country, which is really the mainstay for our area's economy and is now in severe decline given the state of the housing industry; nonetheless if Weyerhaeuser, Georgia Pacific, Crown Zellerbach, or other major timber companies had just cut and run and had they not adopted responsible reforestation programs, as have the State and Federal Governments, we would have, instead of a regenerative resource that keeps our economy strong in the area, we would have just a scarred land, serious soil erosion, and all kinds of ecologically related problems.

So you can imagine the deforestation that is occurring in places like Asia, those places which were referred to, and also in Latin America. That takes a lot of education. It takes a considerable effort among international agencies working closely with government leaders to enlighten their people.

As Mr. Hill pointed out, a lot of the wood is being used for simple basic necessities like fuel, some of the land for grazing. This committee conducted a series of hearings on deforestation. It was the most fascinating subject that we have undertaken since I have been chairman of the subcommittee.

There is a lot of interest and a great deal of commitment out there, but very little is occurring simply because it is a slow process. I understand it will require $3.3 billion—that is an estimate of FAO—to replace the wood now being cut for industrial purposes and for fuelwood. So this might be a short-term windfall for a lot of people, but if we are looking ahead to the future, when you look at all the byproducts that come with trees—chemicals, medication, pulp, paper—this could be a serious problem for the world's economy in the future.

So, Mr. Buckley, first, I would like to ask whether there could be an effort within the administration, at least from those of you who are enlightened, to—well, we have an understandable problem with one's peers inside the White House—to see what motivating forces there are to try to relate the economic and ecological aspects, to see whether we maybe could approach this issue on a more convincing basis.

Mr. **Buckley**. First of all, you made mention of that little acumen. I point out that I lost two elections in the last 6 years—to put things in perspective.

But with respect to this extraordinarily vital issue you are talking about, where we are talking not only of the permanent loss of valuable forest lands but also the impact on species, this is an area where we have, as a Government, and going back 5 years, taken a position of very significant world leadership, I believe.

We convened a U.S. Strategy Conference on Tropical Deforestation in 1978, and followed up by raising the issue in the United Nations in 1979 and 1980. We continue to have an interagency task force at work. I know it is easy to talk about setting up task forces and so on, and issuing reports, as we did in 1980, but these are beginning to be translated into programs being administered through the World Bank, FAO, UNCTAD, and the OAS, which is beginning to raise the level of consciousness. But we continue to have the kind of discouraging statistics facing us because there is a lag, a gap.

With respect to the examples of enlightened approaches practiced here in the United States, I think it is a combination of economic imperatives joined with information, with knowledge, and a recognition that a renewable resource must be renewed. There are beginning to be in places like Costa Rica, for example, an expanded consciousness of the need to set aside forest areas.

A friend of mine, Thomas Lovejoy, of the World Wildlife Fund, is in Brazil right now, where finally in that vast country the necessity to set land aside is beginning to take hold.

I don't want to overestimate the progress being made, but I think we have to acknowledge that (a) there is progress; and (b) that the United States has developed a plan and is using its influence to engage agencies and groups that go beyond its own reach, and, drawing on its bilateral activities in dozens of countries, to promote improved forest conservation, reforestation, and overall management of the resource

Mr. **Bonker**. Mr. McPherson, you are apparently taking notes. Do you want to comment before I ask you a question?

Mr. **McPherson**. I have talked earlier about the extent to which our commitment to reforestation has grown: Some 72 projects in 30 countries; life of projects funding now in process of some $136 million. We see it as just an enormously important problem.

In country after country we see this commitment to do something about it, although we mentioned Asia a moment ago. For example, in 1982 we have a grouping of projects, which will total some $21 million going into India. In 1983, $4.5 million of activities will be started in the Philippines, and $3.8 million in Sri Lanka, very sizable efforts. Nepal is another area where deforestation has taken a tremendous toll.

I would like to comment that over and above this kind of effort, of course, we hope that the World Bank and others will get more into it as well. There are a couple of things I think we need to keep our eye on. There is a need, an ongoing need, for research in this area: New varieties of trees, fast growing and otherwise, and different approaches.

For example, we are now thinking through the possible funding for a Center for Agroforestry. I think a lot of good can be obtained from that. Most of the research in forestry, as you no doubt know, has been done for trees in temperate zones; most of it, a good share of it, done by companies that are very important in your district, for example. That research in large part is done on a relatively few varieties of temperate-zone trees.

There is a lot that could be done, and we think a good deal more needs to be done. In terms of how we get the resources into place to accomplish what we are talking about is an enormous problem. Despite this large growth, $136 million worldwide, it really isn't much compared to the billions that you infer probably would be necessary.

What we really have to do is encourage other countries and the private sector, small farmers or whatever within a country, to really get into the forestry business. A tree lot can be perhaps the most profitable way for a farmer to use some of the land; not only profitable in the sense that if he doesn't do it he is going to lose his land base, but profitable in the sense that it can be an ongoing source of income.

Essentially, it is our conviction that the world won't begin to get this job done unless we can build the institutions, create the technology and convince the private sector.

Mr. **Bonker**. That is what international agencies are all about. When we conducted the series of hearings on deforestation, we heard from FAO, UNEP and others. They are doing that work. They are doing the research. They are trying to advance the technology. They are trying to educate leaders in developing countries to the value of incorporating these programs in their own countries.

But if we don't help to support these agencies, if we don't maintain the financial commitment that allows them to do their work, then we are not going to achieve those goals. Weyerhaeuser is a magnanimous company, but it is not going to set up an education program somewhere in Asia, they will cooperate with the Government in extending this expertise.

That is what concerns me. It is not the bilateral, in this sense, Mr. McPherson. I think you defend your agency very well, and its commitment. I am talking about our contributions, voluntary and nonvoluntary, to United Nations agencies that attempt to make these assessments and move along the technology and make sure other countries have the benefit of that research.

It is hard to communicate these messages at a time when we are going through this awful budgetary crisis; it really is. But I appreciate what AID has been doing.

Mr. Hill, I would like to ask you one question before we close this panel.

You chair the Global Issues Work Group.

Mr. HILL. Yes.

Mr. BONKER. Secretary Watt chairs the Cabinet Council on Natural Resources and the Environment.

Mr. HILL. That is correct.

Mr. BONKER. Do they get into international issues, or do they defer to your group?

Mr. HILL. We haven't had at the Cabinet Council any major discussion of international involvements at this point. There has been some general interest expressed with regard to the Nairobi conference. Now, Secretary Watt has a representative who serves on our Global Issues Working Group, as do all the members of the Cabinet Council.

Mr. BONKER. You must have taken up the acid rain issue that has been very prominent.

Mr. HILL. There has been a discussion of acid rain, yes, in the context of the Clean Air Act.

Mr. BONKER. Well, I wonder how your agency is able to carry out its work if, over the past year, CEQ's staff has been reduced from 50 to 15, if those figures are correct. How many professional, full-time staff people do you have on global issues? First within your own agency.

Mr. HILL. We have three.

Mr. BONKER. So of the 15—are those figures correct?

Mr. HILL. The 15 is correct; yes.

Mr. BONKER. Is that professional staff?

Mr. HILL. That is the total staff and the membership of the Council.

Mr. BONKER. You are near extinction.

Mr. HILL. Endangered species. We do the best we can with the resources at hand.

Mr. BONKER. You say of the 15, 3 are assigned full time to international issues?

Mr. HILL. Not full time, Mr. Chairman.

Mr. BONKER. Before the reduction, did you have full-time staff people on international environmental issues?

Mr. HILL. Oh, yes, sir.

Mr. BONKER. So the attrition rate has been harshest upon those who have been working on international issues, by and large?

Mr. HILL. What we have tried to do is select one or two projects to work on and work on well, and not become involved in a multiplicity of issues at the Council.

Mr. BONKER. What has suffered in this budget reduction from 50 to 15, especially if you had some staff previously assigned full time to global environmental issues?

Mr. HILL. The more universal overview of the Council's staff. Of course, that effort has been reduced. Now, the Council's staff tended to become involved in a lot of issues which were more properly handled by the line agencies themselves. The Council is supposed to be a think tank, if you will, or an academy.

Mr. BONKER. Give me some examples of line agencies and projects.

Mr. HILL. Well, for instance, we had an effort called the upgrade program, which is a data program operated through computers. The Council served as the laboratory for that. It assembles, manipulates data, and can display various environmental factors—air, water quality, and so forth.

The Council had completed that laboratory job. It is a viable program. Now it is being spun out to the appropriate agencies. Part went to EPA, part to the Geologic Survey, and part is in the private sector, because the upgrade program is used by public and private entities. State, city governments, Federal agencies.

Mr. BONKER. So that this subcommittee has an idea of who is doing what, could you supply us with a paper that would give us a breakdown of what projects or areas you are divesting yourself of and to what agencies they are being assigned?

Mr. HILL. Yes.[1]

Mr. BONKER. So we have an idea. It is difficult enough to know. Who does the staff work on your Global Issues Work Group? You chair that. Is it what is left of your staff?

Mr. HILL. We ask the agencies, of course, to do their part. For instance, I made a reference in my presentation to this inventory we are doing of multilateral/bilateral involvements in global environmental issues.

Mr. BONKER. An inventory?

Mr. HILL. Yes.

Mr. BONKER. An inventory of bilateral and multilateral programs?

Mr. HILL. Yes. The State Department is providing the staff backup for that effort.

Mr. BONKER. What are you going to do with an inventory?

Mr. HILL. We want——

Mr. BONKER. Probably turn it over to Stockman, and that will be another hit list.

Mr. HILL. There is none existing anyplace in the Federal Government at this point. We felt it would be good to have that in hand as we review what——

Mr. BONKER. Did you decide to do this yourself, or was this a request from up high?

Mr. HILL. No, this was a decision I had made earlier; that that was a needed part as we analyze where we are headed with regard to the reaction to what flows from the Global 2000 report.

Mr. BONKER. Well, it seems to me, Mr. Hill, you have a very responsible position as head of this important agency, and you are also chairman of the Global Issues Work Group. When the day comes that you depart from that position and return to the private sector, wherever, what do you see as your lasting trademark upon global issues, where you have really made a substantial commitment, where you have made the difference?

Mr. HILL. I used to be very optimistic, Mr. Chairman, and think we could have our forecasting abilities in the Federal Government in working order. My optimism, as I have been exposed to the magnitude of the effort that must be made, if I can leave this having started a process to improve our forecasting abilities, I think I really will have made a mark.

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[1] See appendix 10.

Mr. **Bonker**. So rather than being identified with any particular issue or project, it is just a matter of the forecasting that seems to be your legacy.

Mr. **Hill**. That is one thing in the international area that I feel is very, very important.

Mr. **Bonker**. Is that a mandate from any act of Congress or is that just something that you decided that you wanted to pursue?

Mr. **Hill**. It flowed from the earlier publication of the Global 2000 report. It is one of the major criticisms that was made of the report. It is one of the major findings that the report developed; that our forecasting skills are not what they should be.

Mr. **Bonker**. Going back to more of a generic basis, what mandate does CEQ have on—in other words, why are you here other than my invitation, instead of EPA or somebody else?

Mr. **Hill**. It is in the NEPA law, and further in the Executive order.

Mr. **Bonker**. What does Congress mandate to your agency on global international environmental issues that your agency is supposed to do?

Mr. **Hill**. We are supposed to analyze significant trends is my recollection of the law.

Mr. **Bonker**. So you think that parallels forecasting?

Mr. **Hill**. Yes.

Mr. **Bonker**. OK. Well, as I mentioned earlier, the staff has prepared a number of questions we would like to submit to each of you for a response so that they could be included in the official record. I want to thank each of you for being here this morning as leadoff witnesses on this important subject. It is like the Global 2000 report. It is hard to get a grip on, but we couldn't really have a starting point unless you were here fully representing the administration.

Mr. Buckley, I want to wish you the very best, heading up the delegation to Nairobi. I sincerely wish I could be there, but I know, given your personal commitment, you will do an outstanding job representing the United States.

I would like to ask the next witness to come up to the table, Dr. Thomas Malone, chairman, Commission on International Relations, National Academy of Sciences.

Dr. Malone, it is indeed a pleasure to have you this morning, you being the only nongovernment, directly speaking, nongovernment witness. We know that you are going to make a valuable contribution to our subcommittee's work on this important topic.

Your statement rivals Mr. McPherson's, so I hope you can also match his brevity. I see you have a summarized statement. We will be most pleased to hear from you.

STATEMENT OF THOMAS F. MALONE, CHAIRMAN, COMMISSION ON INTERNATIONAL RELATIONS, NATIONAL ACADEMY OF SCIENCES

Mr. **Malone**. Thank you, Mr. Chairman. I will observe your staff's injunction to confine my remarks to 7 minutes, and will try to touch on only four topics and then perhaps my full statement could be included in the record.

First let me say I am particularly pleased to accept this invitation, since I was privileged to work with Senator Baker, from the Congress, and Chris Herter from the executive branch in preparing the U.S. position for the Stockholm Conference on behalf of the National Academy. I also worked with Barbara Ward and Maurice Strong at the international level, from my position in the International Council of Scientific Unions.

So as one who was also at Stockholm, inspired by the eloquence there and the truly magnificent vision which was presented, I am delighted that you are holding these hearings and hope that they will be a reinvigoration of the enthusiasm and drive and commitment in May in Nairobi.

Now, to get to the four points that I would like to summarize, they first have to do with the changing perception of the issue before us in the last 10 years. You touched upon that when you remarked that it has become the concern of economics. That is exactly the point I wish to make. Environmental protection is now inextricably linked with economic development, especially in the developing countries and, therefore, with the array of issues embraced by population, energy, resources, and environment. That, I think, is brought out very clearly in the world conservation strategy to which reference has been made, the IUCN developed by in UNEP.

I would go one step further. In Mr. Buckley's joint responsibilities, science on the one hand and national security on the other hand, these two responsibilities come together because in my view I agree with the Brandt Commission report that the world is in as much peril right now as it has been since World War II. So it is a matter of national security, not just a matter of preserving the environment. That is point 1 that I wish to make, as is elaborated in my written testimony.

Second, some accomplishments. I would say that the single most significant and meaningful accomplishment in the last decade in the science side has been learning to ask the right questions.

I was there when people, one of my colleagues, one of my students, was worrying about SST's emitting vapor, water, affecting the ozone. That was the wrong idea. He was on the right track, but the wrong idea. Tomorrow a report will be issued from the National Academy of Sciences updating our knowledge of ozone and its depletion by CFM's and it will point out that the steady-state depletion has now dropped from 15 to 20 percent to 5 to 9 percent because of improved chemical reaction rates that we understand; observations now agree with theory.

On the biological side, we are troubled now by the fact that the diminution in the ultraviolet-B, so called, tends to inhibit the natural immunologic processes in living matters, in mice, for example, so that tumors tend to grow when the UV-B is present, whereas, in the absense of UV-B the natural immunization process would take care of these tumors.

So the change in the understanding is enormous in the last 10 years.

I commented on and I will come back to the CO_2 problem, which I view also as one which has undergone a dramatic change and one which is an immediate challenge.

Institutionally, progress, I think, has been one from a perception of managing a global environment as a whole to one of treating global policy as the aggregate of regional, national, and local policies. This is probably healthy, because if you are wrong on a global policy you are wrong everywhere, but you can pick and choose from the best and reject the worst of regional policies.

Mention was made of the seas program of UNEP. That is a good example where instead of trying to address the problems of the global ocean, you pick the immediate, for example the Caribbean, and work at it, and out of the mosaic of original environmental policies and efforts you see evolve Barbara Ward's "Only One Earth" concept of management.

I think understanding of decertification is another manifestation of progress. Your little colloquy on forestry is another. By the way, let me add to your storehouse of information that 1½ billion people depend for 95 percent of their energy on wood. We talk about the oil crisis. That is only part of it. More people have a wood crisis than have an oil crisis.

Mr. **Bonker**. It is a resource that is not being replenished.

Mr. **Malone**. That is correct.

Accomplishments have now been touched upon. Third, let me touch upon disappointments. I think we should look at those, too. The biggest disappointment to me, in light of my association with this process, has been the glacial speed with which global monitoring has proceeded. It was delicately referred to by the panel preceding me as needing some shoring up. I would say this was early on, at the famous Williamstown meeting, identified as the No. 1 item.

It is really appalling that we don't have a better way than we do of assessing the progress or lack of progress.

While I am on that topic, let me say that part of that responsibility, besides being UNEP's, is our own in that when you talk about deforestation or about decertification, or as Gilbert White will the day after tomorrow, talk about agriculturally productive land put into other uses, the remote sensing satellite is a powerful tool which is simply sitting there unused. We turned out a report 5 years ago, "Resource Sensing From Space—Prospects for Developing Countries," and that potentially very important tool is really rusting, and that is a pity.

I would contrast the utilization of this fantastically effective resource-measuring tool with the progress in meteorology, which happens to be an area with which I am familiar. You see the pictures on the television screen every night. That brings me to my final point, the linkage between the nongovernmental scientific community and the intergovernmental organizations, and it is one of complementariness rather than competition.

The reason that you have satellite pictures of the weather patterns on your television screen is because the scientific community formed a pact with the intergovernmental organizations about 10 years ago and developed the global atmospheric research program. This was research on an international basis, so our technology was shared and advanced by interacting with other countries. This is an example of the need of bringing these two groups, each with its own particular strengths and shortcomings, together.

I would simply close by saying that the challenge will become straight in front of us next week in Rome when UNEP sits down with the World Meteorological Organization, FAO, the UNESCO, and the International Council of Scientific Unions, which is a nongovernmental organization, to discuss climate change and specifically the carbon dioxide problem, which I consider to be one of the most important issues in the global environment confronting us in this century.

It is important because, in the first place, no single country can do anything about it; if one country stops using fossil fuel, that is not going to fix the CO_2 climate problem.

Second, it is going to depend upon prediction. We can't wait until we are in trouble and then unwind things. Never before has the world been confronted with such a traumatic decision dependent upon a prediction, using models of the cycling of carbon and the atmospheric response. Yet it could have a profound effect.

All the evidence is adding up. It is too early to face that judgment, but my point is that we will need to draw upon the best of the scientific capability out of the nongovernmental scientific community, with their strengths and weaknesses, and the international governmental organizations with their strengths and weaknesses. The acid test will come next week when these groups sit down in Rome and address this problem specifically.

I will stop there.

[Mr. Malone's prepared statement follows:]

PREPARED STATEMENT OF THOMAS F. MALONE, DIRECTOR, HOLCOMB RESEARCH INSTITUTE, BUTLER UNIVERSITY, INDIANAPOLIS, IND., AND FOREIGN SECRETARY, NATIONAL ACADEMY OF SCIENCES[1]

In responding to your invitation to comment on progress toward the resolution of global environmental problems since the 1972 Stockholm Conference, I would propose to touch on four topics:

+ The changing perception of the environmental issue
+ Major accomplishments of the past decade
+ Failures
+ Future prospects

With respect to changing perceptions of the environmental issue, I would identify two principal developments.

The first is the transformation from the notion that the quality of the environment is principally concerned with its impact on human,animal, and plant life and on the esthetics of man's surroundings (see, for example, Restoring the Quality of Our Environment, a report of the President's Science Advisory Committee, November 1965) to the recognition that it is an integral element in the biological productivity of the biosphere, and therefore inextricably linked to the population/resource/development/energy/environment complex of issues that will be critical to human survival over the next fifty years. We will be severely challenged to insure that our intellectual and managerial skills are sufficient to transform increasingly scarce resources into the goods and services necessary to sustain life and to give to that life meaningful existence for a burgeoning population. We are an interdependent society and must act in concert to address such common problems as: (i) the need for greater production and equitable distribution of food; (ii) the use of international commons, such as the sea, and environmental pollution in the land, on air, and in the seas; (iii) the need for equitable access to and identification of diversified energy and non-fuel mineral resources; and (iv) the need for disarmament and prevention of nuclear proliferation. Each of these problems cuts across national frontiers of decision making and as implications for international relations requiring cooperation and common action -- with all the attendant difficulties of achieving these in a pluralistic society. Some clues to this transformation are found in the World Conservation Strategy promulgated by the United States Environmental Program, the International Union for the Conservation of Nature, and the World Wildlife Fund in 1980 (see Attachment A).

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[1] Two attachments to Mr. Malone's statement are on file with the Subcommittee on Human Rights and International Organizations. "Productivity of Resources and Environments: A National Assessment of Research Trends and Needs," December 1981, can also be obtained from the Institute of Ecology, 4600 Sunset Avenue, Indianapolis, Ind. 46208. The publication by the National Academy of Sciences entitled, "Presentation to the National Science Foundation on the Activities of the ICSU Family," June 26, 1981, can be obtained from the National Academy of Sciences—National Research Council, 2101 Constitution Avenue NW., Washington, D.C. 20418.

A second changing perception is the realization that there is no such achievable objective as a "global environmental policy" as a single unified plan for maintaining life on this planet. The knowledge is still too fragmentary, and even if it were complete, there is no satisfactory mechanism for exercising a global management function. This is probably not altogether bad, since were a global environmental policy to have serious flaws it would affect everyone everywhere. The concept has emerged that anything approaching a global environmental policy is really a mosaic of national and regional policies. This is not merely bowing to political realities, but has the saving grace that errors or achievements in one part of the world can be identified and either corrected or adopted in another part of the world.

Major accomplishments can be divided into two parts: scientific and managerial. Among the scientific accomplishments one must certainly list an emerging capability to "ask the right questions" and a substantial strengthening of our knowledge base as a result. One has only to compare the current literature on the CO_2/climate problem with literature a decade ago to see how substantially the knowledge base has been strengthened as a result of the ability to ask the right questions (see Attachment B for a recent statement on that issue, and compare the report of the Study of Critical Environmental Problems (SCEP) Man's Impact on the Global Environment -- Assessment and Recommendations for Action, sponsored by the Massachusetts Institute of Technology, and developed by a broad-based group of scientists in the United States in preparation for the 1972 Stockholm Conference). Our knowledge of ozone has advanced enormously, as has certain aspects of urban air quality and the decimation of tropical forests. A notable contribution was made by the International Biological Program sponsored by the International Council of Scientific Unions (ICSU), which led to large-scale integrated research programs, including the development of interdisciplinary approaches to biological problems, greater use of systems analysis, increased knowledge and interest in soil biology, improved methods and instruments, and standardization of research methods, so that results from various laboratories are comparable. The Man and Biosphere (MAB) program of UNESCO has moved discernibly to fulfill its four main objectives: the production of new information of intrinsic scientific value; the application of results to land management; the development of the research capacity of developing countries, and elimination of institutional barriers to the conduct and application of interdisciplinary research.

With respect to managerial accomplishments I would make two comments. First, the introduction of Environmental Impact Statements (EISs) has carried us a major step forward in the assessment of environmental consequences of proposals before they are actually undertaken. One of the outstanding examples of this is the Environmental Impact Statement prepared by the Department of Energy on methods for the disposal of radioactive waste -- the extension to the international scene is proceeding in stepwise fashion. Secondly, the tendency to enact legislation before the knowledge base was secure, so notable in the early part of the 1970s, has been replaced by prudence and, in fact, if anything there is a tendency to overswing on this correction in this country at the present time.

If one were to seek to identify a failure -- or more properly, an opportunity missed -- it would be the glacial-like speed with which we have moved internationally to establish an environmental monitoring system. This was one of the first and most important recommendations of the MIT study I referred to earlier, and, of course, it is fundamental to the question of ascertaining whether or not measures are effective in retarding the degradation of the environment, and thereby reducing its biological productivity.

The three factors which will, in my opinion, exert the greatest influence on future prospects are (1) adequate funding, (2) international cooperation, and (3) effective involvement of the nongovernmental scientific community.

With respect to funding I invite your attention to Attachment C, which contains recommendations of a distinguished panel assembled to assess research needs and funding requirements, if we are to meet the challenge of improving the biological productivity of ecosystems. The figure of seven percent per year of annual growth is a measure of the need and the recommendation that a new institutional partnership of effort between the public and private sectors is worth pursuing. Our capacity to participate effectively internationally is dependent upon the strengths of the indigenous research infrastructure in the United States. I must confess to deep concern over the suggestion that the Competitive Grants Program within the Office of Research and Development of EPA is likely to be curtailed.

In a world in which scientific competence in other nations has been dramatically restored since World War II, it is important that we participate in international programs. Not the least important aspect of this activity is the leveraging on the national effort which cooperation with other countries provides.

Finally, I would emphasize the importance of nongovernmental scientific organizations. Their activities are small compared to the intergovernmental efforts, but have two attributes which make them particularly important. The first is the quality control exercised by the fact that not only must the participating scientists value the collaborative activity so highly that he is prepared to leave his individual research and work cooperatively with others. In addition, his institution must be able and willing to permit him to engage in these activities. Someone must also be willing to provide the travel and per diem expenses and staff support in order for these cooperative activities to take place successfully. These three quality control factors have been a firm foundation on which the significance of the nongovernmental organizations contributions depend in large measure. Only the best people will participate, and the work must be so important that their institutions are willing to support them in it. Attachments D and E provide an account of two nongovernmental organizations whose work is particularly notable. In Attachment D I would invite your attention particularly to the discussion by Gilbert White of the activities of the Scientific Committee on Problems of the Environment (SCOPE). With respect to IIASA, I would underscore the importance of their major study on energy, which engaged 140 scientists from 20 countries over a seven-year period to answer the question, "Is it possible to make the transition from the present era of clean fuels (gas, oil) through dirty fuels (tar sands, shale) to a sustainable future of reliance on solar, nuclear, and renewable energy resources to meet the needs of a population which will grow from four billion to eight billion over the next fifty years. A succinct summary of a small library of reports, technical analyses, and executive summaries, is simply that "it could be done."

A major contribution of efforts of the nongovernmental community is that issues may be illuminated and disagreements hammered out in a scientific mode of interaction, which seeks the answer to questions not by any human authority, but through nature itself. This kind of clarification of disagreements and scientific questions is of fundamental importance to the kind of intergovernmental negotiations which are inevitable in the kind of international cooperation that is called for, for example, in the "Global 2000 Report to the President," which notes that if we are to turn around the rather pessimistic outlook should present policies and trends continue, "the needed changes go far beyond the capability and responsibility of this or any other single nation. An era of unprecedented cooperation and commitment is essential."

ATTACHMENT A

Human beings, in their quest for economic development and enjoyment of the riches of nature, must come to terms with the reality of resource limitation and the carrying capacities of ecosystems, and must take account of the needs of future generations. This is the message of conservation. For if the object of development is to provide for social and economic welfare, the object of conservation is to ensure Earth's capacity to sustain development and to support all life.

Two features characterize our time. The first is the almost limitless capacity of human beings for building and creation, matched by equally great powers of destruction and annihilation. The escalating needs of soaring numbers have often driven people to take a short-sighted approach when exploiting natural resources. The toll of this approach has now become glaringly apparent: a long list of hazards and disasters, including soil erosion, desertification, loss of cropland, pollution, deforestation, ecosystem degradation and destruction, and extinction of species and varieties. This situation underlines the need for conservation, comprising the ecologically sound management of productive systems and the maintenance of their viability and versatility.

The second is the global interrelatedness of actions, with its corollary of global responsibility. This in turn gives rise to the need for global strategies both for development and for conservation of nature and natural resources. The international community addresses the former through the development decades and associated enterprises sponsored by the United Nations, and is now addressing the latter through the World Conservation Strategy presented in this pack.

The World Conservation Strategy provides both an intellectual framework and practical guidance for the conservation actions necessary. It calls for global coordinated efforts backed by will and determination, for concerted action at national and international levels, and for global solidarity to implement its programmes. World-wide action to give practical effect to this strategy is a necessary complement to a world-wide programme for rational development of the resources of our planet. Development and conservation are equally necessary for our survival and for the discharge of our responsibilities as trustees of natural resources for the generations to come.

IUCN, UNEP and WWF have joined hands in the preparation of the present World Conservation Strategy, and will continue to coordinate their endeavours in support of its implementation.

Mohamed Kassas President IUCN	Mostafa K. Tolba Executive Director UNEP	John H. Loudon President WWF

The aim

The aim of the World Conservation Strategy is to help advance the achievement of sustainable development through the conservation of living resources. The Strategy:

1. explains the contribution of living resource conservation to human survival and to sustainable development;
2. identifies the priority conservation issues and the main requirements for dealing with them;
3. proposes effective ways for achieving the Strategy's aim.

The Strategy is intended to stimulate a more focussed approach to living resource conservation and to provide policy guidance on how this can be carried out. It concentrates on the main problems directly affecting the achievement of conservation's objectives; and on how to deal with them through conservation. In particular, the Strategy identifies the action needed both to improve conservation efficiency and to integrate conservation and development.

The users

The Strategy is intended chiefly for three groups of user (none of which is wholly separate from the others):

1. Government policy makers and their advisers. Few governments have the financial and technical resources to address all of the problems of living resource conservation at once. Therefore they need to know what needs to be done first. Accordingly, the Strategy both recommends ways of overcoming the main obstacles to conservation and provides guidance on what action is most important. The Strategy is relevant to any level of government with significant responsibilities for planning and managing the use of living resources.
2. Conservationists and others directly concerned with living resources. For this group, the Strategy indicates those areas where conservation action is most urgently needed and where it is likely to yield the greatest and most lasting results. It also proposes ways in which conservation can participate more effectively in the development process, thereby increasing the likelihood of its being positively received by the development community and of helping to ensure that development is sustainable.
3. Development practitioners, including aid agencies, industry and commerce, and trade unions. For this group the Strategy demonstrates that conservation im-

proves the prospects of sustainable development and proposes ways of integrating conservation into the development process. It also attempts to identify those areas where the interests of conservation and of development are most likely to coincide and therefore where a closer partnership between the two processes would be particularly advantageous to both.

Arrangement of the text

The Strategy consists of 20 double page sections. The introduction (section 1). which defines key terms. is followed by three groups of sections. The first group (sections 2-7) describes the contribution of each of the objectives of conservation to human survival and wellbeing: outlines the main threats to them: and identifies the priority requirements for achieving the objectives. The second group (sections 8-14) sets out a strategy for action at the national and subnational levels. A framework for the strategy is outlined: then each of the main obstacles to conservation is described. together with recommendations for dealing with the obstacles. The third group (sections 15-20) is devoted to international action to stimulate and support national and subnational action. Section 20 includes a checklist of priority requirements. national actions and international actions.

Priority issues

The priority issues discussed in the Strategy are (numbers in parentheses refer to sections): reduction in quality and quantity of agricultural land (2. 5. 16) and grazing land (4. 7. 16): soil erosion and the degradation of catchment areas and watersheds (2. 5. 11. 16. 19): desertification (2. 5. 16): loss of the support systems of fisheries (2. 5. 11. 18. 19): extinction of species. subspecies and varieties (3. 6. 15. 17): overexploitation of fish and other wildlife (4. 7. 11. 18. 19): deforestation (4. 7. 16): climate alteration and air pollution (18): narrow sectoral approach to conservation (8. 9): failure to integrate conservation and development (9. 20): inadequate environmental planning and irrational resource allocation (10): inadequate or unenforced legislation (11): poor organization (11): lack of trained personnel (12): lack of information (12): lack of support for conservation (13): lack of conservation-based rural development (14). Most of these problems are common in both developed and developing countries. Several. however. such as erosion. desertification. deforestation and lack of conservation-based rural development. are much more acute in developing countries than in developed ones.

The World Conservation Strategy is intended to stimulate a more focussed approach to the management of living resources and to provide policy guidance on how this can be carried out by three main groups:

- *government policy makers and their advisers;*
- *conservationists and others directly concerned with living resources;*
- *development practitioners, including development agencies, industry and commerce, and trade unions.*

1. *The aim of the World Conservation Strategy is to achieve the three main objectives of living resource conservation:*

a. **to maintain essential ecological processes and life-support systems** (such as soil regeneration and protection, the recycling of nutrients, and the cleansing of waters), on which human survival and development depend;

b. **to preserve genetic diversity** (the range of genetic material found in the world's organisms), on which depend the functioning of many of the above processes and life-support systems, the breeding programmes necessary for the protection and improvement of cultivated plants, domesticated animals and microorganisms, as well as much scientific and medical advance, technical innovation, and the security of the many industries that use living resources;

c. **to ensure the sustainable utilization of species and ecosystems** (notably fish and other wildlife, forests and grazing lands), which support millions of rural communities as well as major industries.

2. *These objectives must be achieved as a matter of urgency because:*

a. **the planet's capacity to support people is being irreversibly reduced in both developing and developed countries:**

- thousands of millions of tonnes of soil are lost every year as a result of deforestation and poor land management;
- at least 3,000 km² of prime farmland disappear every year under buildings and roads in developed countries alone;

b. **hundreds of millions of rural people in developing countries, including 500 million malnourished and 800 million destitute, are compelled to destroy the resources necessary to free them from starvation and poverty:**

- in widening swaths around their villages the rural poor strip the land of trees and shrubs for fuel so that now many communities do not have enough wood to cook food or keep warm;
- the rural poor are also obliged to burn every year 400 million tonnes of dung and crop residues badly needed to regenerate soils;

c. **the energy, financial and other costs of providing goods and services are growing:**

- throughout the world, but especially in developing countries, siltation cuts the lifetimes of reservoirs supplying water and hydroelectricity, often by as much as half;
- floods devastate settlements and crops (in India the annual cost of floods ranges from $140 million to $750 million);

d. **the resource base of major industries is shrinking:**

- tropical forests are contracting so rapidly that by the end of this century the remaining area of unlogged productive forest will have been halved;
- the coastal support systems of many fisheries are being destroyed or polluted (in the USA the annual cost of the resulting losses is estimated at $86 million).

3. *The main obstacles to achieving conservation are:*

a. **the belief that living resource conservation is a limited sector,** rather than a process that cuts across and must be considered by all sectors;

b. **the consequent failure to integrate conservation with development;**

c. **a development process that is often inflexible and needlessly destructive,** due to inadequacies in environmental planning, a lack of rational use allocation and undue emphasis on narrow short term interests rather than broader longer term ones:

d. **the lack of a capacity to conserve**, due to inadequate legislation and lack of enforcement: poor organization (notably government agencies with insufficient mandates and a lack of coordination): lack of trained personnel: and a lack of basic information on priorities, on the productive and regenerative capacities of living resources, and on the trade-offs between one management option and another:

e. **the lack of support for conservation**, due to a lack of awareness (other than at the most superficial level) of the benefits of conservation and of the responsibility to conserve among those who use or have an impact on living resources, including in many cases governments:

f. **the failure to deliver conservation-based development where it is most needed**, notably the rural areas of developing countries.

4. *The World Conservation Strategy therefore:*

a. **defines living resource conservation and explains its objectives**, its contribution to human survival and development and the main impediments to its achievement (sections 1-4):

b. **determines the priority requirements for achieving each of the objectives** (sections 5-7):

c. **proposes national and subnational strategies** to meet the priority requirements, describing a framework and principles for those strategies (section 8):

d. **recommends anticipatory environmental policies, a cross-sectoral conservation policy and a broader system of national accounting** in order to integrate conservation with development at the policy making level (section 9):

e. proposes an **integrated method of evaluating land and water resources, supplemented by environmental assessments**, as a means of improving environmental planning: and **outlines a procedure for the rational allocation of land and water uses** (section 10):

f. **recommends reviews of legislation** concerning living resources: **suggests general principles for organization within government**: and in particular **proposes ways of improving the organizational capacities for soil conservation and for the conservation of marine living resources** (section 11):

g. suggests ways of **increasing the number of trained personnel**: and **proposes more management-oriented research and research-oriented management**, so that the most urgently needed basic information is generated more quickly (section 12):

h. **recommends greater public participation** in planning and decision making concerning living resource use: and **proposes environmental education programmes and campaigns** to build support for conservation (section 13):

i. **suggests ways of helping rural communities to conserve** their living resources, as the essential basis of the development they need (section 14).

5. *In addition, the Strategy recommends international action to promote, support and (where necessary) coordinate national action, emphasizing in particular the need for:*

a. **stronger more comprehensive international conservation law, and increased development assistance for living resource conservation** (section 15):

b. **international programmes** to promote the action necessary to conserve **tropical forests and drylands** (section 16), to protect areas essential for the preservation of **genetic resources** (section 17), and to conserve the global "commons"-- **the open ocean, the atmosphere, and Antarctica** (section 18):

c. **regional strategies** to advance the conservation of **shared living resources** particularly with respect to **international river basins and seas** (section 19).

6 The World Conservation Strategy ends by summarizing **the main requirements for sustainable development**, indicating conservation priorities for the Third Development Decade (section 20).

[From the Washington Post, Mar. 10, 1980]

ENVIRONMENTAL CONSCIOUSNESS-RAISING [1]

Poor countries sometimes think of environmental protection as a luxury for the rich. But violation of the basic conservation rules threatens the whole process of development. Where people are hungry, overuse of the land is a pressing temptation. More than half of India's soil currently shows signs of degradation. In wide areas, flooding and erosion wash nutrients out of the earth faster than farmers can replace them with fertilizer.

The United Nations Environmental Program, in alliance with several other conservation organizations, is undertaking a campaign to raise the consciousness of governments. It invites them to pay closer attention to the destructive side of conventional development. It emphasizes the continuous losses of that most limited of natural resources, the world's supply of productive farm land.

The supply of arable land is diminished when new housing or roads are built in Virginia. It is also diminished when grazing land in central Africa is overstocked and, with the stripping of the cover, the Sahara edges southward into it. Agronomists and soil engineers know a great deal about the costs of careless development. The purpose of the U.N. Environmental Program and its allies, in the document that it calls a world conservation strategy, is to press this knowledge on the people who actually make decisions, public and private, about investment and land-use policy. Like all statements of consensus, this one has its defects. It neglects, for example, the sensitive subject of population growth.

But it delivers a message of some urgency, and delivers it in terms calculated to win a hearing in very diverse places. It provides a series of standards against which any government's decisions can be measured. Above all, it offers a warning that the long struggle to protect land and water is not being won. If the present rates of degradation persist, it says, close to one-third of the world's arable land will be destroyed by the end of the century.

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[1] Copyright the Washington Post.

ICSU NEWSLETTER N.5

MARCH 1981

THE CARBON DIOXIDE-CLIMATE ISSUE

A STATEMENT - 1980

World-wide interest and concern have mounted in recent years over an observed increase in the carbon dioxide in the atmosphere resulting from human activity. A continuation of this increase is expected to modify the world climate with significant social, economic and political implications. Uncertainty characterizes many aspects of this complex environmental and social problem. This has given rise to considerable speculation that varies all the way from fears of impending disaster to the belief that there is no problem. The question has been examined by several responsible organizations in recent years and it is now clear that an inherently international issue involving potentially controversial and divisive aspects does exist. Moreover, a scientific problem of a global nature is involved and an international effort is necessary to illuminate the several scientific aspects that must be resolved to assess the magnitude and character of the issue. Regardless of the eventual importance of the carbon dioxide problem, research on its many components have applications to other major scientific and social questions.

Accordingly, a group of experts convened by the *International Council of Scientific Unions, (ICSU), the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO) in November 1980,* has prepared this assessment which represents the judgement of scientifically knowledgeable and responsible individuals informed on the many aspects of this matter;

Plant and animal life on earth depend on the cycling of elements such as nitrogen, oxygen, carbon and sulphur through the soil,air, water and biosphere. Our attention here is focused on the carbon cycle. Large reservoirs of carbon are stored in the oceans, in the atmosphere and in the biomass. A particularly large reservoir is found in fossil fuels (coal, oil, gas etc.) Hundreds of gigatons* of carbon dioxide are interchanged annually between the oceans and the atmosphere and between the biomass and the atmosphere in the normal and natural course of events. As fossil fuels are used to meet energy demands, carbon is released to the atmosphere primarily as carbon dioxide. In this manner, at present more than five gigatons of carbon are transferred to the atmosphere annually - a significant perturbation. Simultaneously, human manipulation of forests and vegetation provide another perturbation to the natural interchange of carbon. It is the net effect of these perturbations that is responsible for the observed increase in carbon dioxide in the atmosphere. However, the major perturbation arises from the use of fossil fuels.

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* A gigaton is 10^9 metric tons, or 10^{15} grams.

Of the five gigatons of carbon released to the atmosphere each year as a result of the consumption of fossil fuels approximately one-half remains in the atmosphere. The other half is partitioned between the ocean and the biomass. The details of the partitioning are only partially understood but it is believed that the ocean is a major sink, while the biomass may serve as either a source or a sink.

In any case, the increase in carbon dioxide changes the atmosphere's energy balance resulting in a temperature rise at the earth's surface and in the lower layers of the atmosphere. Experiments carried out with global atmospheric models strongly suggest that the carbon dioxide concentrations that might be reached early in the next century as a result of the projected consumption of fossil fuels would increase global average surface temperature by 1°C or more. This temperature change would be significantly greater in high latitudes of the northern hemisphere and slightly less than the global average value in the tropics. Continued growth in fossil fuel consumption, particularly by drawing upon the earth's very large coal resources, could produce still greater increases in carbon dioxide concentrations and climate changes in the future. The more vigorous the growth in energy and fossil fuel use, the more accelerated this process would be.

Since it is the temperature difference between poles and equator that helps to drive the weather systems which influence temperature and rainfall patterns, it is probable that regional ecosystems and hence agricultural production and water supply will be materially affected. Because ocean currents and upwellings, upon which fishing production depends, are largely wind-driven, protein harvest from the sea could also be affected. Finally, significant warming in the Antarctic could, during future centuries, result in the disintegration of a part of that glacier, raising global sea level by several meters. However, there is general agreement that such an impact on sea level is not imminent.

The probability that these potentially serious impacts may be realized is sufficiently great that an international commitment to a programme of co-operation in research is required to illuminate the issues and to reduce uncertainties so that the dimensions and time scale of the problem can be more reliably ascertained.

In broad outline, five areas require attention:

(i) *Likely consumption of fossil fuel in the next century.* This involves population growth, economic development per capita energy consumption, and possible use of alternative sources of energy. For example current projections suggest a trebling of the consumption rate of fossil fuels over the next fifty years.

(ii) *Prospective modes of management of the global biosphere over the next century*. Special attention should be given to the rate of conversion of forests to agricultural and grazing land and to soil erosion. Present indications suggest that the societal pressure on renewable resource systems will lead to exacerbation of the climate/carbon dioxide problem over the next century.

(iii) *Clarification of the carbon cycle and quantification of the partitioning of the carbon dioxide among the atmosphere, the oceans and the biosphere*. The monitoring system for the atmospheric concentration of CO_2 which has been in place since 1957 provided the first credible evidence of this problem. These measurements need replication at other locations worldwide and at several depths in the ocean. Detailed biomass inventories should be undertaken in the terrestrial biosphere and periodically updated through an international programme employing standardized vegetational ground sampling procedures supplemented by the use of remote sensing procedures. The interaction of biogeochemical cycles (carbon, nitrogen, sulphur, phosphorus, etc.) requires elucidation by measurements which will provide the basis for construction models to understand the behaviour of these cycles.

(iv) *The climatic response to increasing carbon dioxide in the atmosphere*. Changes in climate can be estimated from mathematical models of the entire system - atmosphere, oceans, land surface, ice and snow - given solar energy inputs and atmospheric composition. These models, although primitive, have already provided a general indication of some aspects of the atmospheric, oceanic and cryospheric response to an increase of carbon dioxide. Uncertainty remains about the magnitude, timing and geographic distribution of climatic changes for a given increase in atmospheric carbon dioxide. Climatic changes, once established, will almost certainly persist for several centuries.

The experts *brought together by ICSU, UNEP and WMO who are* responsible for this assessment of an important global problem invite the attention of the world scientific community; the nations of the world and the three sponsoring organizations to an issue whose implications we feel commands urgent and universal attention. Finally it should be emphasized that the CO_2 problem affects developing as well as developed nations and calls for a special partnership of effort.

Mr. BONKER. Thank you, Dr. Malone, for an illuminating statement. You have a lot to contribute to our discussion, and I think the scientific point of view is an integral part of our approach to international environmental problems.

You stated that you were involved, at least in preparatory work, with the Stockholm session. Being a participant in that process, now looking back 10 years, what would be your report card?

Mr. MALONE. C-plus.

Mr. BONKER. I can see you could never represent the administration, answering that succinctly.

Do you feel government is maintaining an adequate level of financial support to the scientific community as it relates to this topic?

Mr. MALONE. Now, Mr. Chairman, I don't mean to be impertinent, but you heard the testimony. What do you think? I was not impressed.

Mr. BONKER. Everybody knows what I think. I would like to get on record your views.

Mr. MALONE. I share your views. And the little document that I submitted as an annex suggests that if we are to meet the supreme challenge of the human species over the next 50 years, which is to match our ability, per capita, to transform natural resources into goods and services for a population which, come what will, is growing from 4 billion to 8 billion, and we hope it will stabilize there, unless we increase that, that means by productivity of these ecosystems which are now threatened, well, it is comparable to the nuclear threat, as somebody mentioned this morning.

I feel very strongly about it. I feel that it is as much a matter of national security as it is a matter of pride in our scientific achievements.

Mr. BONKER. I would like to ask you a question, because you were terribly profound in stressing that first point about national security. You know, we always see things in the context of the United States, and maybe our allies, and how we are supporting United Nations initiatives, what we are doing through bilateral programs, how we are attempting to influence responsible decisions.

But there is another part of the globe that has a perhaps different philosophy or approach to scientific and ecologically related questions, and that is the Soviet Union. This isn't a question that has been preceded by a great deal of thought, but I just wonder how sensitive they are in terms of policies and programs, their relationship to the Eastern bloc countries, their spheres of influence. We know that they have made rather impressive gains technologically, at least in the military department. But is there a sensitivity that is being emphasized, especially if there is a growing awareness now of both the economic consequences as well as, as you point out, the security concerns.

I wonder if you could put on your Soviet hat for a moment——

Mr. MALONE. Mine? Sure.

Mr. BONKER [continuing]. Or put on a hat that would give you——

Mr. MALONE. I understand.

I would say, sir, that it is only recently emerging, but it is beginning to emerge, and I see it in individuals such as Professor Kovda, who was chairman of the Scientific Committee on Problems of the Environment which Gilbert White now Chairs, and he will be testifying Thursday.

I see it showing up in Vice President Velikhov of the Soviet Academy, and Vice President Ovvchinokov, and in their Scientific Secretary Skryabin. That sensitivity is not as highly developed there as it is in our country, I don't believe, but it is coming along fast.

Mr. **Bonker**. That is interesting, because a lot of times we run into our colleagues who say, "Well, we would vote for programs, or support programs, if the Soviet Union would match that commitment."

We know up until now that hasn't really been the case, but I think that probably comes with sophistication as well as a realization with respect to the economic, scientific, and security interests involved.

You know this article I referred to earlier about the environment in Asia, and the consequences foreseen now by at least one agency that studied the environmental problems there. The article started by saying that, boasting some of the fastest economic development in the world, the countries of Asia face major environmental problems that threaten their future resources.

It goes on to cite some countries that aren't terribly advanced and some that are. When one considers in the context of economic development and exploitation of the resources to sustain that development, versus the more primitive society that relies on wood, for instance, as a fuel source, it seems to be a universal problem. It really isn't confined to either developed or less developed countries; it is a phenomenon that has problems on both sides, in both areas.

Mr. **Malone**. Yes; and you can find no more vivid example than Mexico City. Mexico is a newly industrializing country. If you have been in Mexico City, you know the stench of raw gasoline is just almost intolerable. If you go to Peking, you see the degradation of the environment about you. So, there are two outstanding examples of precisely what you cited.

Mr. **Bonker**. One question that probably comes close to home refers again to another article in the Washington Post on Sunday that the United States may opt out of the science institute, the International Institute for Applied Systems Analysis, that has Soviet ties. This all came about during a time of détente, in an era of East-West relations, improvements in East-West relations. It now looks as though the administration wants us to pull out.

[The article follows:]

[From the Washington Post, March 27, 1982]

U.S. MAY QUIT SCIENCE INSTITUTE WITH SOVIET TIES [1]

(By Bradley Graham)

LAXENBURG, AUSTRIA.—Roger Wets, an American, and Yuri Ermoliev, a Soviet, spend hours sitting and walking together in this village on the outskirts of Vienna.

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[1] Copyright by the Washington Post. Reprinted by permission.

They are mathematicians, developing computer codes designed to help solve the world's food, energy and environmental problems.

Free of the tensions of their cold-warring governments, these two scientists—and colleagues working in similar fields—say that nowhere else in the world could they meet as they do here.

But the Reagan administration wants to bring the Americans home.

Crying spies, data leakage and one-way benefits for the Soviets, the administration wants to withdraw the United States from a unique, 10-year-old detente-era institute here where 100 scientists from East and West cooperate to seek solutions to problems that plague mankind.

The center, known officially as the International Institute for Applied Systems Analysis, is said by the people here to be the only full-time international interdisciplinary scientific facility in the world.

One million dollars in U.S. funds is at stake—roughly the cost of half a new M1 tank, as those being denied the money like to point out. But it is not just the money, say administration officials, who find themselves embroiled in an interntional controversy over the institute's future.

It is also reaction to events in Poland and Afghanistan and what U.S. officials contend would be the inappropriateness now of maintaining financial support for the institute.

Reagan, in a letter sent this week to Austrian Chancellor Bruno Kreisky, said he opposed continued U.S. involvement in the facility. Kreisky, a strong backer of East-West cooperation, had urged Reagan to show political understanding for the scientific institute's work.

A Reagan administration official involved in drafting the president's position said this week: "The reason IIASA is now the subject of controversy is that it was set up not for good scientific reasons but for political ones. There's a group of people who really value the East-West bridge-building aspect, but that's the point on which the administration can and does disagree."

A number of top U.S. scientists have rallied to the institute's defense. The National Academy of Sciences, which holds the U.S. membership in the institute, passed a resolution last month saying it wants to stay in the program.

But these are difficult times for supporters of East-West contracts, and the institute, a child of detente, stands to lose not only its U.S. parent but its Soviet one too if the administration has its way.

The facility was the outgrowth of an American initiative in 1966 when Lyndon Johnson called for the creation of an East-West institute to work on problems common to industrialized nations. Six years later, during the heyday of detente, it was opened in a handsomely renovated Hapsburg hunting lodge here.

Today, the institute has 17 members, mostly NATO and Warsaw Pact countries, with the United States and the Soviet Union contributing the major portions of the operating budget.

The institute collects data and builds models designed to help governments make complicated decisions on projects affecting their economies and environments. Systems analysis being an intangible craft, the scientists here concede that it is hard to point to concrete products of their efforts.

The value of the institute, its defenders say, is the benefit of working at close quarters with the other side.

"We're not trying so much for breakthroughs as for better understanding," said institute spokesman Peter Schlifke, explaining that a major aim is reaching international agreement on a more factual means for decision-making in such fields as energy, pollution and ecology. "It's certainly not only the research that's important. It's personal contact and learning what makes the other side tick."

Reagan administration officials have not been impressed with the concept of the institute or the quality of its work. In a letter this week to Frank Press, president of the National Academy of Sciences, Reagan's science adviser, George Keyworth, affirmed the administration's opposition to future participation in the institute, charging "Soviet abuse" and a "lack of reciprocity" in its programs.

Keyworth added, "It would be particularly inappropriate to continue our involvement in IIASA in light of other actions we have taken to show our displeasure about martial law in Poland."

One of the things that irked Washington is that the Soviets, through the institute, could plug into extensive U.S. data banks—in particular, a computer hookup to the Lockheed Corp.'s file of unclassified bibliographical information.

This enabled Soviet scientists to obtain easily all references in U.S. publications to such specialized areas as remote sensing by satellites of agricultural crops.

Institute officials, acknowledging that the flow of computer information between Eastern and Western members is unbalanced, argued that the Lockheed information is freely available to anyone who pays for the service. But the institute has now discontinued the Lockheed link.

U.S. security concerns grew last year after allegations in the European press that the institute's secretary, Arkady Belozerov, was a contact for a Norwegian double agent, passing information to the KGB, the Soviet espionage agency.

Belozerov, the highest-ranking Soviet in the institute at the time, resigned shortly after the story broke and institute officials—stressing that nothing secretive or classified is done there—have sought to distance the facility from the affair.

Roger Levien, the institute's director at the time and now director of systems analysis at Xerox, said in a phone interview that the Soviets were "stupid" for using the institute as a cover.

"But I'm convinced," he said, "there's no national security threat from IIASA. In fact, it's the other way around. The national security interests of the world demand that the United States remain a member."

Institute officials say the center serves Western interests by exposing the Soviets to broader scientific influences and encouraging them to adopt a more rational—and thus more predictable—approach to major decisions.

C.S. "Buzz" Holling, a Canadian ecologist and the institute's current director, accused Reagan administration officials of showing "abysmal ignorance" about the nature of the institute's work.

"I see them taking an essentially ideological point of view and criticizing specific one-way transfers without considering the multiplicity of the whole effort," he said. "If they are going to attack things like that, they're attacking the heart and essence of scientific inquiry."

The controversy takes place against the backdrop of big reductions in the overall U.S. science budget. Money for the National Science Foundation, which in turn funds the National Academy of Sciences and, through it, the institute here, was cut 40 percent last year.

To maintain some U.S. presence here, the academy has asked for at least $1 million, down from $2.3 million in years past. U.S. businesses also contribute about $300,000.

Backing on Capitol Hill for the institute is wavering in view of the security concerns raised by the administration. The House Committee on Science and Technology this week approved an amendment that would deny funds if the president determines "that participation in the institute is contrary to national security interests."

Mr. **Bonker**. I wonder how you would respond to that in light of what you said earlier about the private scientists complementing Government interagency programs and the need to have this kind of interaction if we are seriously going to address some of these scientific and environmental problems.

I guess what I am asking is, here is an opportunity, if you want to comment on that report.

Mr. **Malone**. I deeply regret that action. I think it is a mistake.

Mr. **Bonker**. OK.

We wanted to conclude these hearings at 12 o'clock. We have reached that time.

Dr. Malone, I think you have been one of the more interesting witnesses that we have had before the subcommittee, and you certainly have a lot more to offer than we have given time for today.

Mr. **Malone**. Call me back to talk about acid rain.

Mr. **Bonker**. I am sure there are many areas we could cover with your expertise. I do appreciate what you have given us this morning. Thank you for taking the time to be here.

The next hearing on global environmental issues will be held on Thursday at 2 p.m.

So with that, the subcommittee stands adjourned.

[Whereupon, at 12:02 p.m. the subcommittee adjourned, to reconvene at 2 p.m., Thursday, April 1, 1982.]

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REVIEW OF THE GLOBAL ENVIRONMENT TEN YEARS AFTER STOCKHOLM

THURSDAY, APRIL 1, 1982

House of Representatives,
Committee on Foreign Affairs,
Subcommittee on Human Rights
and International Organizations,
Washington, D.C.

The subcommittee met at 2:15 p.m., in room 2255, Rayburn House Office Building, Hon. Don Bonker (chairman of the subcommittee) presiding.

Mr. Bonker. The subcommittee will be in order.

This is the second in a series of three hearings being held by the subcommittee on the subject of a review of the global environment 10 years after Stockholm. The hearings are in preparation for the upcoming special session scheduled for Nairobi. This is an opportunity for us to take a critical look at the world's environment and to view implementation of the goals that were established in Stockholm.

In the first session we heard from the administration and from the National Academy of Sciences, primarily from those who represent the various departments within the administration, to better understand their views and their level of commitment, particularly financial, and the kind of representation we can expect at the Nairobi conference.

Now as we move into the second set of hearings, we are interested in hearing from some of the experts, people who have the depth of knowledge that can help provide this subcommittee with basic information, that will help the Government to proceed in an even more vigorous way to support those policies and programs that will protect our environment.

We are privileged to have with us today Dr. Gilbert White of the Institute of Behavioral Science at the University of Colorado, Boulder, very close to my hometown, and also Lester Brown, who is president of the Worldwatch Institute, and then Dr. Ghillean Prance, vice president for research, New York Botanical Gardens.

We are privileged to have the three of you with us. Unless there is any objection, we will begin with Dr. White.

STATEMENT OF GILBERT F. WHITE, PROFESSOR EMERITUS OF GEOGRAPHY, INSTITUTE OF BEHAVIORAL SCIENCE, UNIVERSITY OF COLORADO

Mr. WHITE. Mr. Chairman, looking back a decade to the Stockholm Conference on the Human Environment, three major questions may be asked. First, what actions were taken in response to the recommendations on which the assembled national representatives agreed? Second, what in fact happened to the global environment during that period? Third, what lessons may be drawn from appraisal of the actions and their apparent effects?

I shall address the second question on the basis of a report recently completed on trends in the world environment, 1972–82. As one participant in that effort I shared in its preparation and formed a few judgments as to its implications for U.S. policy.

When interested people hear about the resulting report they usually want to know in a nutshell what it shows about world trends and how that picture compares with the view presented in Global 2000. At the risk of distorting or misinterpreting a large and complex analysis, I venture a textual comment and then present a series of summary statements from the report to give the flavor and character of the conclusions which emerge.

On each point a fuller text is available drawn from Government reports and the international scientific literature.

The overall comment is that some dimensions of the environment, such as air quality in high-income cities with regulations and water quality of many inland streams and the volume of biosphere reserves are improving, while some other dimensions such as air quality in low income cities without regulations and the acidity of some lakes and the extent of tropical moist forests are degrading. For an unhappily large number of environmental conditions there is not enough data of reliable quality for a long enough period of time to warrant a judgment. This is true of such features as soil degradation in many humid areas and the quality of large groundwater reserves and the contamination of coastal waters.

The World Environment, 1972–82, can be compared at a few points with the Global 2000 Report to the President of 1980. Because the latter document was directed at projections for 2000 while the former concentrates on what was known to occur during the 1970's, direct comparison is difficult, but there are a few overlaps insofar as projections for the future are based on or assume some state of affairs in the base years.

A comparative analysis of the two reports prepared by a seminar at the University of Colorado, a copy of which I include as a part of my testimony, reveals major differences and similarities.[1]

The World Environment findings suggest a number of points at which the U.S. Government should be alert to opportunities for action, to strengthen the capacity of the nations to maintain and enhance their resource base. These include measures to advance research on the basic environmental processes, to monitor accurately what is taking place, to train people to cope effectively with problems of resource management, and to join with other countries in cooperative action for our common good.

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[1] The report is on file with the Subcommittee on Human Rights and International Organizations.

Among these, two lines of action seem to me to especially merit emphasis today.

First, there clearly are a number of sectors of the environment in developing countries where deterioration is taking place, the technical grounds for corrective measures are known, and the United States could help retard or reverse the course of events by sharing its training facilities, technical competence, and financial resources.

Examples are the degradation of productive irrigated lands through salinization, the worsening facilities for water supply and sanitation in growing tropical cities, and the conversion of forests in critical watersheds. Other examples could be cited. None of these are new, none insoluble, and each represents a situation in which past U.S. programs have sometimes exacerbated and sometimes improved conditions.

The basic responsibility rests with the country itself but the rate and quality of corrective action can be enhanced by cooperative assistance from the outside. An observer is impressed by the number of nations now joining in that direction and by the difficulty of working out genuinely helpful measures.

The problems are more often social and economic than technical. The United States has taken and should continue to take steps to promote constructive measures, through its Agency for International Development, and by sharing in support of the United Nations Development Program, the United Nations Environment Program, the World Bank, and the various specialized intergovernmental agencies engaged in such work.

Second, in preparing to deal with a few matters of undoubted long-term international concern, the United States would advance its understanding of possible corrective actions and would reduce its eventual expenditures by strengthening the cooperation of its scientists with other nations and with international nongovernmental scientific organizations.

The problems of alterations in the global carbon, nitrogen, and sulfur cycles, of understanding the processes by which land quality is improving or degrading as a result of use transformations, and of evaluating the precise impacts of chemicals in the environment cannot be solved by U.S. scientists alone.

Beyond the ordinary channels of communication among research workers there need to be concrete means for findings and methods to be exchanged promptly and appraised impartially. The SCOPE initiative in bringing together scientists from a dozen countries to examine the global biogeochemical cycles and their interactions is one example. The UNEP coordinating effort for research on ozone is another. A joint WHO-WMO-UNEP program is basic to recognition of significant changes in air quality. There is growing recognition that if a balanced and accurate picture is to be obtained of what is underway in the conversion of tropical forests there must be close collaboration among national and international forestry and biology experts and independent investigators in conducting integrated ground and remote sensing surveys.

U.S. scientists play important roles in these efforts, and U.S. science is enhanced by them. The Nation would be derelict in failing to continue to exercise a leading part in what is a responsibility of the human family to preserve and use wisely its basic resources of air, water, soil, and life.

In these and a few additional directions it is in the interest of the Nation to join its scientific forces with those of other countries. Through the Department of State the United States has taken a positive and helpfully critical interest in these efforts.

The record of the past decade shows that environmental systems are more complex, their monitoring goes more slowly, and their wise management is tougher and more cumbersome than was generally thought at the Stockholm Conference. Degradation continues in some sectors but has been reversed in others. Scientific understanding is deeper, with certain issues resolved and others uncovered.

International collaboration on environmental matters expanded mightily, and the United States played a major role. If it is to help curb further deterioration and is to enter soundly into international negotiations over CO_2 ozone, acid precipitation, toxics in the oceans, forest destruction and similar issues, it must strengthen that action in the decade ahead.

Thank you.

[Mr. White's prepared statement follows:]

PREPARED STATEMENT OF GILBERT F. WHITE, GUSTAVSON PROFESSOR EMERITUS OF GEOGRAPHY, INSTITUTE OF BEHAVIORAL SCIENCE, UNIVERSITY OF COLORADO AT BOULDER

Looking back a decade to the Stockholm Conference on the Human Environment, three major questions may be asked. First, what actions were taken in response to the recommendations on which the assembled national representatives agreed? Second, what in fact happened to the global environment during that period? Third, what lessons may be drawn from appraisal of the actions and their apparent effects? I shall address the second question on the basis of a report recently completed on trends in the world environment, 1972-1982. As one participant in that effort I shared in its preparation and formed a few judgments as to its implications for United States policy.

Method of Preparing Report

The report on The World Environment, 1972-1982 published this month by the Tycooly International Publishing in Dublin for the United Nations Environment Programme (UNEP) was initiated by the Executive Director of UNEP on the instructions of its Governing Council. He first appointed a Senior Scientific Advisory Board to consider the topics to be covered, the experience and information on which to draw, and the types of scientific personnel on which to draw. The Board included scientists from 13 countries and as many disciplines. Against the background of their advice, the Executive Director commissioned 17 review papers from individuals or institutions in 15 nations. Thus, a U.S. scientist prepared a review of changes in soil productivity, a British medical faculty examined changes in public health related to the environment, a Soviet group appraised changes in the atmosphere, and so on.

The papers when drafted were circulated for review by experts in the United Nations organization and specialized agencies, and were revised in the light of their critical comments. Some were entirely rewritten. A revision then was sent to all member nations and to specialized agencies for further examination and those comments were consolidated and used in a special workshop convened in Nairobi in March, 1981. In some instances a total rewriting was undertaken by another scientist, including several on the staff of the United Nations. Responsibility for the final revisions were placed in the hands of three editors drawn from the Board -- Martin W. Holdgate, chief scientist of the UK Ministries of Environment and Transportation; Mohammed Kassas, Professor of Botany, Cairo University and President of the International Union for Conservation of Nature and Natural Resources and I--to produce a unified volume with the assistance of a UNEP scientific and editorial staff.

A strength and also a source of weakness was the systematic attempt to involve scientists from all countries having competence in environmental matters. This assured representation of numerous points of view but it made the writing of a single volume a ponderous and somewhat disjointed process.

The resulting analysis did not attempt in most instances a projection of the state of the environment beyond 1982. Rather, it focused on what were known to be the trends in the environment during the decade. It was primarily diagnostic, not prognostic.

While the choice of writers was influenced by desire to represent a spread of nationality, the resulting texts were not evaluated on political criteria. The editors were never under pressure to adjust their findings to the anticipated reactions of government agencies.

When interested people hear about the resulting report they usually want to know in a nutshell what it shows about world trends, and how that picture compares with the view presented in Global 2000.

Selected Findings

At the risk of distorting or misinterpreting a large and complex analysis I venture a capsule comment and then present a series of summary statements from the report to give the flavor and general character of the conclusions which emerged. On each point a fuller text is available drawn from government reports and the international scientific literature.

The overall comment is that some dimensions of the environment, such as air quality in high income cities with regulations and water quality of many inland streams and the volume of biosphere reserves are improving, while some other dimensions such as air quality in low income cities without regulations and the acidity of some lakes and the extent of tropical moist forests are degrading. For an unhappily large number of environmental conditions there is not enough data of reliable quality for a long enough period of time to warrant a judgment. This is true of such features as soil degradation in many humid areas and the quality of large groundwater reserves and the contamination of coastal waters.

Now for the summary paragraphs.

On the atmosphere--

Acid rain was established as a phenomenon that resulted from the long-distance transport of sulphates and nitrates produced primarily by fossil fuel combustion. Its adverse effects, such as acidification of inland waters, were of increasing concern during the decade.

Carbon dioxide concentrations were slowly and steadily increasing, chiefly as a result of the increasing use of fossil fuels and forest clearing. This phenomenon has important--but as yet incompletely understood--implications for world weather conditions and agriculture, because it could alter temperature and precipitation patterns and the distribution of snow and ice cover.

The depletion of ozone postulated early in the decade as a result of supersonic transport and increasing releases into the stratosphere of chlorofluorocarbons from such sources as spray cans and refrigerators, was undetectable with current methods. There was, therefore, uncertainty over whether or not the process was occurring and whether its predicted environmental consequences, one of which was an increase in human skin cancers, were likely.

Photochemical oxidants, which cause smog, decreased in cities with effective controls, and increased where controls were absent or ineffective or where automobile use increased.

Sulphur dioxide and suspended particulate matter concentrations were decreasing in most cities with control policies, but increasing elsewhere, especially in developing countries.

Stratospheric particulates appear to have increased somewhat, with possible undetermined effects on climate.

Despite the occurrence of extreme atmospheric events in various parts of the world during the 1970s (severe droughts, disastrous floods, consecutive cold winters and tropical storms), there is no evidence of marked changes in the variability of weather over recent decades. Variability is the norm in weather, and the fact that extremes occur does not necessarily mean that the climate is changing.

On the marine environment--

Organochlorine pesticides and polychlorinated biphenyls (PCBs) were found to be widely distributed in the sea and marine life. However, the concentrations of DDT and related pesticides fell in coastal waters of northwest Europe and North America, and PCBs also showed some indication of decline. Except in the most highly polluted coastal localities, there was no evidence that marine productivity or fish stocks had been reduced through chemical contamination, or that floating oil had affected the recruitment rates of fish or shellfish. However, many scientists were cautious in their reaction to this generally reassuring picture because there were deficiencies in monitoring and because they were uncertain over the possible long-term effects of ecosystem exposure to contamination.

World fishery yields rose during the 1960s and 1970s, with a dip in the production curve in 1972/73. Some populations--notably of Peruvian anchoveta and North Atlantic herring--were depleted, with over-exploitation commonly blamed. Some argued that world landings in 1980 were 15-20 million tonnes less than they would have been had good management prevailed. By the end of the decade, however, there were hopes of recovery in several fish stocks as a result of tighter controls. Looking ahead, substantial increases in marine food production appeared possible, partly through mariculture, which expanded greatly, especially in China and South-East Asia.

On inland waters--

Of the three major uses of water (domestic supplies, industry and agriculture), agriculture made the major demand, for irrigation; and the decade saw further extension of irrigation (and improved drainage) to newly reclaimed lands, especially in arid regions. Industrial uses increased during the decade, but savings were also made through increased efficiency. In Japan, for example, total industrial withdrawals increased from about 50 million cubic metres daily in 1965 to 120 million cubic metres in 1974--but by the mid-1970s two-thirds of this was recycled water compared with one-third in 1965.

The large numbers of people with no access to safe, clean water and no sanitary services was a matter of deep concern to the world during the 1970s. This concern was expressed at the United Nations Conferences on Human Settlements (1976) and on Water (1977). These shortages were most pronounced in rural areas: in 1970 only 14% of people there had access to safe water supplies. By 1980 that proportion had risen to only 29%. Rural people were even worse off for sanitary facilities: by 1980 only 13% had them. The picture was different for urban dwellers: in 1970, 67% had access to safe water supplies and 71% to sanitary facilities, while by 1980, 75% had safe water but those with sanitary facilities had dropped to 53%.

Inland fisheries catches increased from about 5.2 million tonnes in the 1950s to about 10 million tonnes between 1973 and 1976. Creation of new inland fisheries in man-made lakes contributed to this growth. Aquaculture showed much promise, increasing production by 5-6% in some countries and as much as 10% in others.

One issue that received much attention during the decade was the environmental effect of large, man-made lakes. Because of the seriousness of some of their adverse impacts, the economic justification for some of these lakes was questioned.

In some places and in some ways, the world's water resources were worse off in 1980 than at the time of the United Nations Conference on the Human Environment (Stockholm, 1972). But there were some more positive aspects during the decade. Planning benefitted from more and better data and improved understanding, stemming from research. Flood forecasting became more accurate and some major rivers became less polluted. Irrigation practices were improved and extended. And some national water development plans went into action, while internationally, agencies were set up to assist in co-operative development of shared water resources.

During the decade, the elaboration of the theory of plate tectonics helped scientists increase their understanding of how and where minerals are formed and how crustal movements take place. This theory explains how major surface features of the earth were shaped by the movement of large solid pieces (plates) of crustal material over the plastic layer of the mantle. These processes, still operating today, are responsible not only for catastrophic phenomena such as earthquakes or volcanic eruptions, but also for mineral formation. The theory thus facilitated exploration of various types of mineral deposits. It was also important for environmental policies aimed at husbanding finite resources.

The definition of resources and reserves and their classification were advanced during the decade, emphasizing the tentative nature of many resource estimates and the fact that at any one time such estimates are strongly influenced by investment factors. Much argument occurred during the 1970s over the increase in mineral consumption and the possibility of depleting mineral resources. In an absolute sense the Earth cannot "run out" of mineral raw materials since mankind's use of them shifts them from place to place rather than destroys them, though it does increase, often prohibitively, the technical difficulty and economic expense of recovering them.

Annual production of almost all major nonmetallic minerals expanded during the decade. With a few exceptions, metal production increased at a moderate rate, but annual volumes and prices fluctuated widely as a result of economic and political conditions.

Important improvements were made in the methods used to reduce deleterious effects of mining, treatment and transport of both metallic and non-metallic minerals. Advances occurred chiefly in dust control, the reclamation of open pits, reduction of acid drainage and treatment of tailings and liquid waste. One estimate, made in mid-decade, suggested that 40-60% of lands disturbed by mining were either in the course of natural restoration or were being reclaimed.

Recycling and substitution of mineral raw materials received renewed attention during the 1970s, but some thought their role might have been over-stated: they are not new ideas, and they are not magic solutions to scarcity. Mid-way in the decade, however, the amounts of some scrap metals being recycled in the United Kingdom and the United States were equivalent to a substantial proportion of world production for that year.

Some industrialized countries continued to depend heavily on the importation of a few strategic minerals, so that minerals formed an integral part of international deiplomacy. For example, the United States between 1976 and 1979 imported 94% of its bauxite, 97% of its manganese, and all of its columbium and titanium. Supply, demand and price fluctuations of strategic minerals sometimes seriously disrupted the economies of producer countries dependent on such exports.

Earthquakes, volcanoes and landslides claimed their tolls of lives and damaged property during the 1970s, as they had in previous decades. The Tangshang earthquake of 27 July 1976 was a catastrophe with an intensity reached only a few times in recorded history: it killed at least 242,000 people and injured a comparable number. The decade also saw the first successful preduction of a major earthquake; in the Haicheng area of the People's Republic of China in 1975. More reliable warning systems seemed possible, and some progress was made in managing land use and building design and construction in such a way as to reduce human activities on areas vulnerable to earth movements.

On terrestrial biota--

Where development has been hampered by poverty or driven by great urgency, the fertility of the land and stability of the soil has been placed in jeopardy. Whole species or populations of plants and animals have disappeared, causing a loss of genetic resources that is not only regrettable from an aesthetic or philosophical point of view but also threatens man's food supply.

The need to secure development while at the same time sustaining the productivity of natural renewable resources and protecting wildlife and genetic diversity was the focus of a major publication at the end of the decade: The World Conservation Strategy, prepared by IUCN in partnership with UNEP and WWF. In a sense, the Strategy can be looked upon as the culmination of more than a century of conservation efforts from around the world.

One of the chief subjects of public concern during the decade was the rate at which the tropical rainforests were being changed--often with considerable loss of fertility. Exact figures of the extent of this destruction were not available by the decade's end, and estimates varied from 7 to 20 million hectares a year. Transformation of the rainforests was occurring everywhere they are found, proceeding much further in Africa than in Asia and Latin America.

In tropical deciduous forests, savannahs, grasslands, steppes and areas with Mediterranean climate, another problem was paramount: desertification. This process claimed vast areas in many parts of the world during the decade.

The regions containing temperate evergreen forests and broadleaf deciduous forests--which in North America and Europe include some of the most densely populated and highly industrialized regions of the world--were generally well-managed and remained fertile, although areas with natural and semi-natural plant and animal life are very restricted. Further north the boreal coniferous forest zone was much less affected by man, although it is an important timber source. During the decade fears were expressed that acid precipitation could retard tree growth over wide areas. The sensitivity of coniferous trees to air pollution was well known from laboratory experiments and observations in areas near smelters. But by the end of the decade there was still uncertainty about the extent of such damage in nature.

Although great areas of the Arctic tundra--an ecosystem that provides valuable grazing ground for nomadic tribes--are wilderness, parts of it were threatened and in some cases severely damaged by the search for oil and gas during the decade. Local disturbance and damage have been caused in the Antarctic by visiting tourists and scientists.

Islands, mountains and wetlands, ecosystems of special sensitivity and richness of animal and plant life, had their own special problems. The introduction of continental species to islands has in some cases completely transformed the vegetation. Phosphate mining also made a marked impact, as did mass tourism, particularly in the Caribbean. Erosion in mountain areas was accelerated by deforestation, overgrazing, inappropriate cultivation, fire, road building and other factors. Dams and reservoirs sometimes led to flooding in wetland areas, and in other cases to changes due to a lack of water supply. Draining of wetlands was another problem while coastal wetlands were being drastically reduced by agriculture and reclamation for buildings, docks and industrial development.

On the positive side, the decade saw a number of international conventions that fulfilled recommendations of the Stockholm Conference go into effect. International conferences were held on desertification and forestry, the number and area of nature reserves increased worldwide, and germplasm banks were established for crop plants and livestock.

On agriculture, forestry and the environment--

More than 450 million people were chronically hungry or malnourished during the decade. For although total food production increased nearly everywhere, it was unable to match population growth in many parts of Africa, Asia and Latin America. The annual rates of increase in food production varied from a low of 0.12% for coffee to a high of 6.83% for soybeans. Increases in animal products ranged from 2.98% for meat, to 2.53% for eggs and 1.64% for milk. Some crops suffered a production drop: jute and fibre went down 4.96%, wool by 1.1%. According to the Food and Agriculture Organization of the United Nations (FAO), a 60% increase in food, fish and forest production will be needed just to maintain current consumption patterns to 2000 A.D.--let alone increase them.

The decade's production increases resulted largely from bringing new areas under cultivation or irrigation. For example, following India's dramatic successes in the Green Revolution of the 60s, more and more land was irrigated. Rangeland management was improved through control of overgrazing in arid lands. However, in some countries agricultural land was being transformed into other uses, thus reducing productive potential. During the decade, in developed countries alone, more than 30,000 square kilometres (km^2) were turned into settlements and roads. Worldwide, an estimated 50,000 to 70,000 km^2 was lost to food production in this way.

Soil degradation--erosion, salinization and alkalinization, and chemical degradation--occurred in many parts of the world and caused production losses. Salinization caused abandonment of about the same area that was being reclaimed and irrigated, and was particularly acute in semi-arid and arid regions. Fully half the irrigated soils in the Euphrates Valley in Syria, 30% in Egypt and more than 15% in Iran were believed to be affected by salt or waterlogging.

Desertification continued on a grand scale during the decade: some 60,000 km^2 of land were destroyed or impaired annually as a result of severe and recurrent drought and human exploitation. Large areas of the Sudan, Ethiopia, Somalia, Senegal, Brazil, Iran, Pakistan, Bangladesh, Afghanistan and the Middle East turned into deserts. Between 600 and 700 million people were threatened by this inexorable deterioration. The cures for desertification are well-known, but although a United Nations Conference held in 1977 produced a Plan of Action to Combat Desertification, these cures had not been put into effect in much of the world by 1980.

The decade marked the beginning of what may be a new era in biological production: the biotechnological era. Advances in genetic engineering made possible the production of many valuable substances with the aid of microbes and their enzymes. Production of insulin, interferon and some vaccines was shown to be possible in this way. There were prospects of developing cereal crops capable of fixing atmospheric nitrogen. The Earth's bioproductive systems may in future have to produce not only food, fibre and timber, but also industrial materials and fuel. This would cause increased competition for land.

Concern continued about the side-effects of agricultural chemicals on the environment. Nitrogenous fertilizer production worldwide in 1970/71 amounted to 33,064 thousand tonnes and 53,795 thousand tonnes in 1978/79. FAO estimated that by 1985/86 world consumption would be up to about 84 million tonnes. Nitrates from fertilizer residues polluted ground and surface waters, with consequent hazards to aquatic life and human health. Chemical pesticide usage also increased greatly, with adverse effects on some animals, fish and birds. Yet crop losses were so great in some places that there were good arguments for using more pesticides rather than less. At the same time, the demand for increased testing of new pesticides for environmental effects was slowing the introduction of new ones by industry. And meanwhile, pests were developing resistance to the older types in ever-increasing numbers.

During the decade, public concern was expressed about effects of pollutants especially nitrogen and sulphur oxides, acid rain and photochemical smogs, on crop plants, forest trees and livestock.

Post-harvest losses of crops caused concern: losses in rice crops in Southeast Asia were estimated to range up to 37% of the crop. Wastes from livestock and crop residues caused pollution, but methods were being investigated of turning them to useful ends, for example, in biogas production.

As the decade ended, the priorities in agriculture and forestry were clear for the next decade: more action was needed to stop desertification to conserve soil, to manage forests and water wisely, and to use appropriate methods of cultivation.

Other findings deal with changes in population, human settlements, human health, industry, energy, transportation, tourism, education, and peace and security as they relate to the environment, but they are not summarized here.

The full text will be available shortly.

Comparison with Global 2000

The World Environment, 1972-1982 can be compared at a few points with The Global 2000 Report to the President of 1980. Because the latter document was directed at projections for 2000 while the former concentrates on what was known to occur during the 1970s, direct comparison is difficult. But there are overlaps insofar as projections for the future are based on or assume some state of affairs in the base years.

A comparative analysis of the two reports prepared by a seminar at the University of Colorado, a copy of which is included as part of my testimony reveals major differences and similarities.

NOTE.—Copies of the report referred to filed in committee office.

Policy Implications

The significance of these changes in terms of desirable international response is canvassed by the UNEP report being prepared for presentation to the Governing Council. The editors of The World Environment, 1972-1982 have commented on the current needs from the standpoint of the scientific community in a separate article in Environmental Conservation. Improved monitoring is a matter of high urgency.

Implications for United States Policy

The World Environment findings suggest a number of points at which the United States government should be alert to opportunities for action to strengthen the capacity of the nations to maintain and enhance their resource base. These include measures to advance research on the basic environmental processes, to monitor more accurately what is taking place, to train people to cope effectively with problems of resource management, and to join with other countries in cooperative action for our common good.

Among these, two lines of action seem to me to especially merit emphasis today.

First, there clearly are a number of sectors of the environment in developing countries where deterioration is taking place, the technical grounds for corrective measures are known, and the United States could help retard or reverse the course of events by sharing its training facilities, technical competence and financial resources. Examples are the degradation of productive irrigated lands through salinization, the worsening facilities for water supply and sanitation in growing tropical cities, and the conversion of forests in critical watersheds. Other examples could be cited. None of these is new, none insoluable, and each represents a situation in which past United States programs have sometimes exacerbated and sometimes improved conditions. The basic responsibility rests with the country itself but the rate and quality of corrective action can be enhanced by cooperative assistance from the outside. An observer is impressed by the number of nations now joining in that direction and by the difficulty of working out genuinely helpful measures. The problems are more often social and economic than technical. The United States has taken and should continue to take steps to promote constructive measures, through its Agency for International Development and by sharing in support of the United Nations Development Programme, the United Nations Environment Programme, the World Bank and the various specialized inter-governmental agencies engaged in such work.

Second, in preparing to deal with a few matters of undoubted long-term international concern the United States would advance its understanding of possible corrective actions and would reduce its eventual expenditures by strengthening the cooperation of its scientists with other nations and with international non-governmental scientific organizations. The problems of alterations in the global carbon, nitrogen, and sulfur cycles, understanding the processes by which land quality is improving or degrading as a result of use transformations, and of evaluating the precise impacts of chemicals in the environment cannot be solved by United States scientists alone. Beyond the ordinary channels of communication among research workers there need to be concrete means for findings and methods to be exchanged promptly and appraised impartially.

The SCOPE initiative in bringing together scientists from a dozen countries to examine the global biogeochemical cycles and their interactions is one example. The UNEP coordinating effort for research on ozone is another. A joint WHO-WMO-UNEP program is basic to recognition of significant changes in air quality. There is growing recognition that if a balanced and accurate picture is to be obtained of what is underway in the conversion of tropical forests there must be close collaboration among national and international forestry and biology experts and independent investigators in conducting integrated ground and remote sensing surveys. United States scientists play important roles in these efforts, and United States science is enhanced by them. The nation would be derelict in failing to continue to exercise a leading part in what is a responsibility of the human family to preserve and use wisely its basic resources of air, water, soil and life.

In these and a few additional directions it is in the interest of the nation to join its scientific forces with those of other countries. Through the Department of State the United States has taken a positive and helpfully critical interest in these efforts.

The record of the past decade shows that environmental systems are more complex, their monitoring goes more slowly, and their wise management is tougher and more cumbersome than was generally thought at the Stockholm Conference. Degradation continues in some sectors but has been reversed in others. Scientific understanding is deeper, with certain issues resolved and others uncovered. International collaboration on environmental matters expanded mightily, and the United States played a major role. If it is to help curb further deterioration and is to enter soundly into international negotiations over CO_2, ozone, acid precipitation, toxics in the oceans, forest destruction and similar issues it must strengthen that action in the decade ahead.

Mr. **Bonker**. Thank you, Dr. White. The chairman is appreciative of your summarized statement and your full text, of course, will be included in the official record. I intend to follow with some questions after we have heard from the other two panelists.

STATEMENT OF LESTER R. BROWN, PRESIDENT, WORLDWATCH INSTITUTE

Mr. **Brown**. Mr. Chairman, my topic is cropland and soils, and what I would like to do is to submit as my testimony selected excerpts from a book entitled "Building A Sustainable Society."

In looking at the issue of soils, and in particular cropland conversion, there was relatively little attention paid to this at Stockholm. I think the reason for that was that the definition of the environmental problem at Stockholm was largely dictated by the industrial countries and therefore pollution was the focal point of the conference.

What we have seen since Stockholm is an unfolding of the soil erosion problem on a scale and at a rate that has led to a far more serious situation than existed 10 years ago. In looking at the various environmental problems, there are some in which things are improving. I think air pollution in most industrial countries would be an example of that. Water pollution in many parts of the world has improved as a result of the efforts and initiatives taken since Stockholm.

But with soils not only have things gotten worse but we are far from turning the corner on this issue, that is, from arresting the increasing deterioration. We now have enough data on the loss of topsoil around the world, incomplete though it is, to be able to say without qualification that civilization as we know it cannot survive the continuing loss of topsoil at current rates. I don't think most governments have yet grasped the significance of this problem.

Mr. **Bonker**. May I ask about that? The topsoil problem exists in the United States as well as in other countries. I heard recently that a few years back we had 14 inches of topsoil and that has come down now to 8 inches.

Considering our advanced technology in agriculture, isn't there any way that we can deal effectively with that problem?

Mr. **Brown**. We are not dealing effectively with it at the moment. I can't attest to the 14 versus 8 inches, but there are many parts of the country where that would certainly be the case. We are now losing more soil than we did at the peak of the Dust Bowl era; that period has now become a well-known chapter in our national history.

The difference is that at that time most of the erosion was wind erosion; it was mostly in the Western Plains; it was highly visible. Today it is mostly water erosion; it is mostly in the Corn Belt and down through the Southern States.

Mr. **Bonker**. Water erosion.

Mr. **Brown**. Erosion by running water.

Mr. **Bonker**. That is a rather natural, if not regenerative, phenomena, isn't it?

Mr. **Brown**. Both wind and water erosion are natural phenomena. Water erosion is as old as the Earth. The problem is, the difference between now and earlier periods is the rate of soil erosion. As long as the rate does not exceed the rates of new soil formation, you are OK. But now a third or more of the world is losing topsoil faster than new soils form. That is why you now have 8 inches where once you had 14.

Mr. **Bonker**. A nonexpert like me would think perhaps overharvesting and even the loss of our trees contributes.

Mr. **Brown**. It is a combination of things. One of the most common problems particularly in the Midwest and the rolling lands of, say, western Iowa, Missouri, or other parts of the Midwest, is that land that once was rotated with grass and hay and row crops such as corn and then back into grass, being in corn maybe 3 years out of 10—with the enormous demand for grain in the world market as well as in the United States, and modern technologies, chemical fertilizer—that land is being planted in corn year after year after year now, and under those conditions is beginning to lose topsoil at a rapid rate.

Mr. **Bonker**. How about urbanization? Sometimes that threat occurs where soil is the richest.

Mr. **Brown**. Most of the world's cities, not surprisingly, have evolved in areas where the topsoil is richest because those soils could support the denser populations. So urban sprawl everywhere in the world exacts a heavy toll on prime cropland. That is a problem not only in the United States where we see it in the urban sprawl, the highways, shopping centers. It is happening in China, too, for example, where industry has been expanding at 10 percent a year since 1960.

You have to build factories where the people are. In China most of their billion people are in a 1000-mile strip on the eastern and southern part of the country, so whenever they want to build a factory it is almost always in a ricefield. There are many factories, thousands of them now on land that until not too many years ago was producing two rice crops a year. That is one reason why China is importing much more grain from the United States now.

Mr. **Bonker**. It seems to me a country like China, which has had such a population burden over so many years, would almost reach the limit of their topsoil. The United States is a relatively new country, and even with the expanding population it has not had anywhere near the per capita impact we find in China.

Mr. **Brown**. That is correct. We have a lot more slack in our system to work with. The impact it has had on the Chinese has been a sobering one. The pressures on their soils and on their cropland base are such that it has convinced them, as they look ahead and try to project trends, that they cannot settle for an average of two children per family but have to try for one child per family. They are the first society ever to move in that direction.

Mr. **Bonker**. You fly over the country and you look down; except for the rice paddies, it is a rather barren landscape. One wonders how it can sustain any kind of natural growth or food production.

Mr. **Brown**. Once you get away from the rich rice areas there is not very much left.

Mr. **Bonker**. Proceed. I am sorry to have interrupted.

Mr. **Brown**. In looking at the soil erosion problem in the United States, we face a serious problem. We are one of a great many countries around the world. If one looks at the situation in the Soviet Union, another of the world's major food producing countries, the reports from the Soil Erosion Laboratory, written by soil scientists, paint a very bleak prospect for Soviet agriculture based on soil erosion in large areas of the Soviet Union.

So the scientists are very much aware of the problem, and that is, in my opinion, one of the reasons why the Soviets are now importing such enormous quantities of grain. They continue to blame it on the weather, and weather may play a significant role, but there are other basic problems as well that are getting worse.

At least a couple of times in the last several years, we have tried to get information from the State Department and AID, and from surveys of countries through our embassies, what was happening to soils in the Third World. Those reports from countries like Indonesia, Ethiopia, and so forth, make some rather grim reading.

We have a serious problem. We, the world, have a serious problem on the agenda and are not yet close to responding to it effectively. We were talking earlier about the Dust Bowl and the current situation. The difference between the Dust Bowl period and the current situation is that during the Dust Bowl we did pass legislation creating the Soil Conservation Service, funding a new program in the midst of what is probably the worst economic crisis the country ever faced. But there was an awareness and there was leadership, and we don't seem to have that. And it may well be the leadership on this issue will have to come from the Congress.

The problem of soil erosion is a serious one. The other part of the problem—that is, the cropland conversion we were talking about a minute ago—is also a serious one. One of the interesting characteristics of population growth is that it both generates a demand for more cropland and simultaneously increases the pressures to convert cropland to other uses. It is a problem on every continent.

If the deterioration of soils continues, it will eventually convert into declining food production and declining living standards. For one continent, Africa, the lines have already been crossed. Since 1970 per capita food production in Africa has fallen 13 percent. There are three important factors contributing to this.

One is the fastest rate of population growth of any continent in history. Second is, as best I can tell, the most rapid rate of deterioration in the countryside in the form of soil erosion, soil degradation, and so forth. Third, ill-conceived agricultural policies. Indeed these three factors are interacting to lead to a continuing decline in per capita food production in Africa.

Mr. **Bonker**. Let me explore that for a moment with you. You have given Africa as an example of a rapid deterioration of soil. You cite three reasons: Population growth, deterioration of the countryside, and ill-conceived agricultural planning. It seems to me that Africa is experiencing an explosion of urban growth. Not so much new generations but people moving from the countryside to the bright lights in places like Lagos and Khartoum. That is really becoming a problem.

That means people are moving out of the countryside, and at the same time they have really not taken advantage of advanced technology and made agricultural use of the land. Also, they don't have thousands of factories spread all over the landscape of Africa.

I am wondering how these three factors really relate, because it seems to me there is something of a population growth but it is not occurring in the countryside. Second, if there is deterioration in the countryside, it has to be due more to natural phenomena than to what we in the industrialized world are experiencing because of land exploitation.

How do you reconcile these?

Mr. **Brown**. There are a number of things involved. One, the forces moving people from the countryside to the city are in some cases pushes and in some cases they are pulls. There are the bright lights and, at least, the hope of a job to pull people to the city. But the deterioration in the countryside acts as a push. In recent years in the Sahelian countries it has led to the loss of grazing capacity. Many of the nomads who once could live reasonably comfortably in the countryside no longer can, and many of them are now in cities. In Lagos you have a pull factor, pulling people into the cities. It is somewhat generalized for all of Africa, but the deterioration in the countryside is a factor.

Mr. **Bonker**. What is the problem?

Mr. **Brown**. Overgrazing, plowing land that will not sustain cultivation over the long term.

Mr. **Bonker**. Hasn't that always been the case?

Mr. **Brown**. Not in the way in which it now is. You have to keep in mind that Africa's population is growing at about 3 percent per year. That leads to a nineteenfold increase in a century. There is a limit to how long any piece of land, whether it is the continent of Africa or any place else, can sustain that kind of population growth.

Mr. **Bonker**. Again, China is an example that has——

Mr. **Brown**. They have come to the end of the road.

Mr. **Bonker**. How would you compare China and the African Continent in terms of soil erosion?

Mr. **Brown**. The Chinese situation is far more stable.

Mr. **Bonker**. Why? It seems to me the land is more fully exploited in China than it is in the vast continent of Africa.

Mr. **Brown**. The differences are many, but one is that in China the cultivation is wetland rice cultivation and wetland rice is by definition planted on flatland, so the erosion problem that occurs on rolling land is not a problem in the wet rice-growing area of China, which is the bulk of their food economy. So, there are importance differences.

In that sense, the Chinese are in better shape. They don't face the same kind of erosion problem that many other countries do.

Mr. **Bonker**. You said that grazing was a contributing factor.

Mr. **Brown**. In the Sahelian countries, in particular.

Mr. **Bonker**. With "desertification" there is a problem in the Horn of Africa?

Mr. **Brown**. That is a combination of overgrazing, deforestation, often because of firewood demands. There is the problem of piling up a lot of land, which is semiarid in many cases and which is not very stable once the ground cover is removed. So, there is a combination of forces at work, but the bottom line in all of them is that in vast areas of Africa in the countryside the soil base is deteriorating; and even if at some point down the road we get the brakes on population and we put together the right kinds of agricultural policies, the soil base may be gone. So it is important to focus on it sooner rather than later.

The situation in Africa has reached a point where the World Bank, which has reported a decline in per capita living standards for 15 countries since 1970, is now projecting a decline in per capita income, a continuing decline of per capita income for much of sub-Saharan Africa. This is the first time that the Bank has projected a sustained decline in living standards for any area of the world.

The Bank economists are beginning to sense the kind of problems unfolding in Africa. The risk is in other areas with similar situations—that is rapid population growth and deterioration in the countryside—we may also see a decline in per capita food production and living standards.

The Andean countries of Latin America, with which Dr. Prance is much more familiar than I, might be leading candidates to be next on the list. The Indian subcontinent, particularly with the deforestation and erosion in the Himalayas where most of the major river systems originate, could find itself in difficulty.

The problem in most cases is not that we lack the technologies or the knowledge of what to do about the problem. Certainly in this country our problem is not that we don't know how to control soil erosion; we do. Most of the techniques which we have used, and others used successfully in other countries could be adapted throughout the world.

So, it is not so much a lack of technology; it is a lack of political leadership. It is a lack of political will, and in some cases it is a lack of understanding of the nature and dimensions of the problem.

In this country the Soil Conservation Service a few years ago sketched out a very detailed conservation program for the United States. So many million acres need to go into minimum tillage, 17 million acres need to be taken out and put into grass or trees before the topsoil is lost entirely, et cetera. So we have a rather detailed national plan for us. The problem is we haven't been able to get it adopted.

Mr. **Bonker**. If it makes you feel any better, the administration is greatly reducing the Soil Conservation Service budget to help us attain those goals.

Mr. **Brown**. I know that. It presents an interesting contrast, because in the 1930's when we were in real economic difficulty, we were able to launch a whole new program—it wasn't just a matter of increasing.

The SCS estimates we will need to roughly double last year's budget, which was just under $1 billion, in order to have an effective erosion control program. Instead of increasing it we have cut it by 15 percent.

Mr. **Bonker**. It is going to be cut a lot more.

Mr. **Brown**. The long-term cost will be very high for a short-term saving.

Mr. **Bonker**. That is a story that is all too familiar in this budget exercise we are going through. We have short-term goals and long-term risks. So that political leadership, I think, will only arrive when the public understanding to which you refer has been established. Sometimes we have to reach a crisis before the understanding is achieved.

Mr. **Brown**. Maybe the signal will come at the supermarket checkout counter and then we will realize something is happening out in the countryside. It will be a little late then, though.

Mr. **Bonker**. And cost three times as much.

Mr. **Brown**. Yes.

In looking at many developing countries, a back-of-the-envelope calculation suggests that some will have to commit more resources to an adequate soil conservation program than is now budgeted for the entire Ministry of Agriculture.

Mr. **Bonker**. Can you say that again?

Mr. **Brown**. In many developing countries an adequate soil conservation program may require more funding than is now being committed for the entire Ministry of Agriculture. That is to say it costs a great deal in Ethiopia, or wherever, to have an effective program.

Mr. **Bonker**. Of course this country could help through our bilateral assistance programs in encouraging these countries to plan more responsibly for their soil conservation, but the last time I looked at the foreign aid bill we had taken $1 billion out of the development accounts and put it into military credit sales to the same countries.

Mr. **Brown**. At some point we may want to ask ourselves in this country whether it is more important to spend another $1 billion on soil conservation to protect our cropland base—which I would argue is our most important productive natural resource in this country by far—or spend that $1 billion on another MX or two B-1's, or whatever.

I think the national security analysis, if done, putting them on the table together, would opt in favor of protecting our production resource base. It would be easier for us to provide leadership in the Third World on this issue if we could set an example ourselves. Unfortunately, we are not doing so at the moment.

Some of the things we have done in the last few years I think have been important contributions. The Resource and Conversation Act, passed in 1977, I believe, was an important instrument for getting the information, the data base needed to design an effective program. We have the data now. That has been quite successful. I think the Global 2000 study that Gil White referred to was an important contribution at the global level.

The interesting thing is that today the Governments of Japan, Canada, Germany, and China are paying far more attention to that study which we did than we are.

Mr. **Bonker**. That is not unusual. The Japanese paid a lot more attention to our earlier industrial technology and are willing to back that knowledge with an investment that has made them vastly superior. We are now going through a similar exercise.

Mr. **Brown**. Indeed they have. In that vein I might mention I happened to be in Japan last June meeting with the new energy development organization people at the time when the budget cuts were coming out here, and the announcement was made that our photovoltaic research development budget had been cut by about 40 percent and the Japanese were beside themselves. They think we are going to hand them this industry on a platter. Though it is our technology and we developed it, they are taking it. They fully expect to take the world market because of our negligence at this point.

Mr. **Bonker**. The Japanese environmental consciousness has been rather late in coming.

Mr. **Brown**. It has. The occasion for my being in Japan was as a guest of the Japanese Government to do a series of lectures commemorating the 10th anniversary of the creation of their environmental protection agency, which sort of combines our CEQ and EPA into one organization.

Another thing we have done in this country that I think was a very useful thing was the national agricultural lands study completed about a year and a half ago. That provides a very good analysis of the nature of our problems.

It seems to me in terms of leadership the most important thing that we can do at the moment is to mount an effective response to our own problems, and then use that as a basis for talking with countries that benefit from our bilateral aid programs and other things. Unfortunately, we haven't reached that point yet.

Thank you, Mr. Chairman.

[Mr. Brown's prepared statement follows:]

Prepared Statement of Lester R. Brown, President, Worldwatch Institute

ERODING THE BASE OF CIVILIZATION

Croplands are the foundation not only of agriculture but of civilization itself. When soils are eroded and crops are poorly nourished, people are often undernourished as well. Thus, the loss of soil is in some ways the most serious of the threats civilization faces. Degraded biological systems can usually recover if given the opportunity, but an inch of topsoil lost through erosion may take nature centuries to replace. Similarly, alternatives to oil can be developed, but there are no widely usable substitutes for soil in food production. Civilization can survive the exhaustion of oil reserves, but not the continuing wholesale loss of topsoil.

Since mid-century, pressures on the earth's croplands have mounted. Growing populations demand more land not only for food production but for other purposes as well. Even as the need for cropland expands, more and more farmland is being put to nonagricultural uses. Worse, the most productive croplands are the most likely to be converted to nonfarm uses.

As the eighties unfold, humanity faces a worldwide shortage of productive cropland, acute land hunger in many countries, and escalating prices for farmland almost everywhere. In a world with no excess agricultural capacity, the continuing loss of prime farmland anywhere can drive food prices upward everywhere.

Thinning Topsoil

World food output has more than doubled since 1950, yet that impressive increase has entailed land abuse so severe that fully one-fifth and perhaps as much as one-third of the world's cropland is losing topsoil at a rate that is undermining its long-term productivity. Data released by USDA in early 1981 showing that the inherent productivity of 34 percent of U.S. cropland is now falling because of an excessive loss of topsoil underlines the gravity of the problem.

Soil erosion is a natural process, one that occurs even on land in grass or in forests. But on land that is cleared and cropped, erosion often accelerates. Whenever the pace of erosion exceeds the natural rate of soil formation, what soil scientists call the tolerance or "T factor", the topsoil thins and eventually disappears, leaving only subsoil or even bare rock. New soil formed by natural processes commonly ranges from two to five tons per acre per year. Only when the soil erosion exceeds this does the land begin to lose its long-term productivity. When the topsoil can no longer adequately support crops, the land is abandoned. But the gradual loss of topsoil and the slow decline in inherent fertility that precedes abandonment may take many decades.

As the worldwide demand for food mounts, cultivation is being so intensified on some soils that excessive erosion and a gradual decline in inherent soil fertility are resulting. Elsewhere, cultivation is being extended onto less productive, erosion-prone soils. For most countries, the growing demand for food is internally generated, but for the United States the stresses on soils come from growing food deficits worldwide.

Within the United States, this mounting demand for food since mid-century, combined with the availability of cheap nitrogen fertilizer, has led farmers to abandon traditional rotations that included soil retaining pastures and hay in favor of continuous cropping of corn and other row crops. As a result, the overall gains in grain production since mid-century have been impressive, but the price paid in lost topsoil has been high. Fourteen years of data gathered at the Missouri Agricultural Experiment Station show land planted to a corn-wheat-clover rotation losing an average of 2.7 tons of topsoil per acre annually through erosion, whereas comparable land planted continuously to corn lost 19.7 tons per acre annually. While the first is well within the tolerance range established by soil scientists, the latter leads to a progressive thinning of the topsoil layer and a steady decline in inherent land productivity. In Iowa alone, 260 million tons of soil is lost from cropland each year. According to the Iowa State University Experiment Station, that soil "simply cannot be replaced within our lifetime or those of our children. The eroded soil is gone, depleting the fertility of the land."

Concern with these trends in the United States lead in 1977 to the passage of the Soil and Water Resources Conservation Act, which called for a detailed survey of the state of U.S. soils. Soil scientists discovered "alarmingly high" rates of erosion by water in several states. Tennessee, for example, was losing an average of 14.1 tons of topsoil per acre of cropland; Missouri, 11.4 tons; Mississippi, 10.9 tons; and Iowa, 9.9 tons. In the Great Plains, wind erosion was particularly severe, claiming an average of 14.9 tons per acre in Texas and 8.9 tons in Colorado.

Nationally, water erosion alone removes annually some two billion tons of U.S. topsoil--1.01 billion tons more than is formed each year. Assuming 160 tons per acre inch of soil and a typical topsoil depth of 8 inches, this billion tons represented the loss of 781,000 acres of cropland equivalent per year. One obvious way of curbing this excessive loss would be to return to rotation cropping, but unfortunately, this less intensive form of cultivation would not yield enough to satisfy burgeoning grain-import needs abroad.

Elsewhere in the world, the doubling of demand for food over the past generation has forced farmers onto dry and steep lands, which are inherently susceptible to erosion. In the Third World, record rates of population growth have forced farmers onto mountain soils, leaving them no time to construct terraces. Once the natural cover is removed, the topsoil quickly washes into adjacent valleys, where it silts streams, reservoirs, and canals.

In Andean Latin America, skewed land-ownership patterns can aggravate this problem. Wealthy ranchers use the relatively level valley floors for cattle grazing, forcing small landholders onto steep slopes to produce subsistence crops. This pattern leads to severe soil erosion on the slopes, which impairs the productivity of both the mountainsides and the valleys.

In dryland wheat producing areas, pressures to reduce the area in fallow can also sap the soil of moisture, as happened in the U.S. Great Plains during the Dust Bowl years and in the Soviet Virgin Lands during the sixties. Except where land can be irrigated, the natural constraints on cultivation under low-rainfall conditions cannot be altered substantially.

Where fallowing and other restitutional agricultural practices have fallen by the way, compensatory measures can go only so far. In the Soviet Union, attempts to regain food self-sufficiency by investing heavily in agriculture are stymied because soils have lost some of their inherent productivity. Measuring extreme degradation of croplands in terms of gully formation, soil scientists at the Soil Erosion Laboratory at Moscow University have found that while only 2 percent of the south central Soviet Union shows severe gullying, as much as 50 percent of the land could follow suit as efforts to intensify agriculture proceed. A parallel Soviet study of the present gully network in the Steppe and Forest Steppe regions in the European USSR found that gully formation has accelerated as "good land reserves became exhausted and sloping land began to be plowed." In an analysis of Moscow's agricultural plans, Harvard University's Thane Gustafson observes that the Soviet Government must now reckon with "50 years of neglect [that] have left a legacy of badly damaged soils."

Even while soil erosion raises the demand in the Soviet Union for food imports, it reduces export capacity elsewhere. For example, Australia is experiencing serious soil erosion as it responds to the growing world demand for grain exports. Canberra-based soil scientist C. L. Watson reports that "some 50 percent of our existing agricultural and arid lands need ameliorative measures to just maintain present productivity."

Neighboring Indonesia is falling prey to the same neglect. A report from the U.S. embassy in Jakarta indicates that soil erosion is bringing on an "'ecological emergency' in Java, laying waste to land at an alarming rate, much faster than present reclamation programs can restore it." Similar pressures are building in Pakistan's rainfed agricultural regions. An AID officer in the Punjab area reports the annual abandonment of several thousand hectares of cropland because of severe degradation caused by erosion. In Nepal, the country's rivers now annually carry 240 million cubic meters of soil to India, making that country the recipient of what has been described as Nepal's "most precious export."

In Ethiopia, according to U.S. AID Mission reports, "there is an environmental nightmare unfolding before our eyes.... It is the result of the acts of millions of Ethiopians struggling for survival: scratching the surface of eroded land and eroding it further; cutting down the trees for warmth and fuel and leaving the country denuded.... Over one billion--one billion--tons of topsoil flow from Ethiopia's highlands each year." In South Africa, biologist John Hanks estimates that the province of Natal, incorporating Kwazulu, is losing 200 million tons of topsoil annually, Far from complete, this litany of disasters merely suggests the scope and impact of soil erosion. A 1977 United Nations survey reported that almost one-fifth of the world's cropland is now being steadily degraded.

Determining the precise effect of topsoil loss on cropland fertility is complicated since increasing fertilizer use can disguise declining natural productivity. However, Cornell University's David Pimentel has noted three U.S. studies showing that, other things being equal, corn yields decline by an average of "four bushels per acre for each inch of topsoil lost from a base of 12 inches of topsoil or less."

Underscoring the gravity of the erosion threat is convincing evidence indicating that adopting erosion-control practices is in most cases not cost-effective for the farmer. An interdisciplinary team of agricultural scientists studied land in southern Iowa where erosion was excessive and calculated the projected near-term costs of erosion in terms of additional energy use, additional fertilizer use, and reduction in yields. They found that the costs of reducing soil erosion to a tolerable level came to three times the immediate economic benefits of doing so. Unless government were to share the cost of erosion control practices, a typical farmer with a narrow profit margin and with land suffering from excessive erosion would appear to have two choices: adopt the costly erosion control measures needed and face bankruptcy in the near term, or continue with business as usual until eventually the inherent productivity of the land fell to the point where it would be abandoned.

Another study undertaken by three agricultural scientists in neighboring Illinois attempted to determine whether terracing on sloping lands could be economically justified from the farmers' standpoint. The team noted that 9.7 million acres of the state's cropland is sloping and that only 14 percent this acreage is adequately protected from erosion. After analyzing a number of soils common in Illinois, they concluded that "except in a few situations, the farmer will sacrifice income to control erosion by constructing terraces."

The tough choice confronting farmers in the U.S. midwest must be made the world over. Differences in economic systems notwithstanding, the same basic pressures on the land are at work everywhere. In the interaction between the demands of the economic system and the tolerance of ecological systems, ideological boundaries count for little.

Spreading Deserts: The Human Hand

In semiarid regions where human and livestock populations are expanding at record rates, once useful land is turning to desert or desertlike terrain. According to reports prepared for the U.N. Conference on Desertification in 1977, some 630 million people, or one person of every seven, live in arid or semiarid areas. An estimated 78 million people inhabit lands rendered useless by erosion, dune formation, changes in vegetation, and salt encrustation. For this group, desertification means the destruction of livelihood as well as land.

Agronomists who specialize in managing arid and semiarid croplands have long been aware of the mounting pressure on fragile arid soils and of their progressive deterioration. Not until the droughts of the late sixties and early seventies in Sahelian Africa, however, were the social consequences of desertification--starvation and dislocation--painfully apparent.

Fed by human abuses of the land--overgrazing, deforestation, and overplowing--the world's major deserts are all growing larger. As human and livestock populations increase, deserts or desertlike conditions are spreading in Africa, the Middle East, Iran, Afghanistan, and northwestern India. Although its southward spread gets more attention, the Sahara Desert is also marching relentlessly northward, squeezing the populations of North Africa against the Mediterranean. It is also expanding westward into Senegal and southeastward into the Sudan. Readings taken of the Sudan in 1958 and again in 1975 indicate the southeastern Sahara annexed some 90 to 100 kilometers during the 17-year period. Brazilian ecologist J. Vasconcelos Sobrinho reports that the semiarid tip of Brazil's Northeast is being desertified; similar conditions are developing in Argentinean states of La Rioja, San Luis, and La Pampa.

The desert's insidious march has a particularly long history in the Middle East and Western Asia. The site of many early human civilizations, the arid landscape of this region has suffered millenia of imprudent cropping and soil erosion. Vast expanses have been transformed into deserts, capable of supporting fewer people than they did thousands of years ago. In the Middle East, even some rainfed farmlands are succumbing to desertification. Where cultivation has been pushed onto lands with extremely low and unpredictable rainfall, widespread desiccation has followed. According to Ibrahim Nahal, Professor of Forestry and Ecology at the University of Aleppo, improper cultivation in the rainfed agricultural zone of Syria, Jordan, and Iraq has led to a reduction in the yield of cereals, still the dietary staple. Northwestern India is now the world's most densely populated arid zone, and quite possibly the dustiest. By extending cropping to submarginal lands, farmers there and elsewhere are creating potential "dust bowls."

The food outlook for desert countries is a matter of concern. Of 16 desert countries, per capita grain output has fallen over the past three decades in all but four. Primarily by expanding irrigation, four countries (Iran, Libya, Senegal, and the Sudan) offset the effects of land degradation.

Among the remaining 12 countries, the drop in per capita grain output in Algeria, Iraq, Jordan, Lebanon, Mali, and Niger was precipitous--40 percent or more between 1950 and 1980.

While agricultural prospects and potentials differ among arid regions, desertification imperils food production wherever it occurs. It undercuts the benefits of agricultural investments even in countries that, judged by aggregate national statistics, appear to be making rapid agricultural gains. Populations in many arid regions have already reached the ecological danger point as the spread of desert-like conditions make all too clear.

Conversion of Cropland to Nonfarm Use

The global cropland base is also threatened by the conversion of agricultural land to other uses. Agriculture's principal competition for land comes from urban expansion, village expansion, energy production, and highway construction. In the United States, the world's leading food producer, nearly a million acres of prime cropland was converted to nonfarm uses each year between 1967 and 1977. In the extreme case of Florida, source of half of the world's grapefruit and a quarter of its oranges, all the prime farmland will be put to other uses by the end of the century if the trend continues. In Virginia, 24 percent of the prime cropland would be lost; in California, 16 percent.

Rural states are also feeling the squeeze. According to Allen Hidlebaugh of the National Agricultural Lands Study staff, "even in America's agricultural heartland--the corn belt states--there is cause for concern. We anticipate a total 3.2 million acre prime farmland loss in Iowa, Illinois, Indiana, Ohio, and Missouri combined. If present trends continue to the year 2000, the annual loss will equal 480 million bushels of corn--at $2.50 a bushel, a permanent loss of $1 billion a year, every year, by the century's end."

Data on changing land use elsewhere confirm that the growth of cities is a leading source of cropland loss. A study of urban encroachment on Europe's grazing lands and croplands from 1960 to 1970 found that West Germany lost 1 percent of its agricultural land every four years. For France and the United Kingdom, it was nearly 2 percent for the decade. For the Third World, information on land lost to rapid urbanization is sketchier. But U.N. demographers expect the world's urban population to expand from 1.81 billion in 1980 to 3.16 billion in 20 years. If this projected increase created a need of only .04 hectares per person, then the world's cities would occupy an additional 54 million hectares of land by 2000. If 40 percent of this total is converted cropland, cities would consume an area equal to the cultivated area of France.

Although this projected loss would amount to less than 2 percent of the world cropland, the impact on world food output is likely to be greater since cities are situated on the most fertile soils. A study of changing land-use patterns in Canada reports that "half of the farmland lost to urban expansion is coming from the best one-twentieth of our farmland." But even if the best doesn't go first, the worldwide loss of 25 million hectares will mean the loss of enough food to feed some 84 million people.

Even outside of cities, habitats claim farmland. In the Third World, village growth extends into agricultural fields. Analyzing village growth in his native Bangladesh, Akef Quazi concludes that the amount of land occupied by the village correlates closely with the number of families in the village, in part because homes are "made of locally available materials, such as bamboo, thatch, and corrugated iron sheets, and, as such, are never strong enough to hold an upper story."

Bangladesh's problem is also India's. Living space requirements of the 14 million Indians added to the population each year are at least partly met by homes built on cropland surrounding the nation's cities and 600,000 villages. Further east, China is also losing cropland to cities and industry. USDA China specialist Alva Erisman reports that "water control projects, urban growth, and the appropriation of agricultural land for roads, railroads, airfields, industrial plants, and military uses has removed good farmland from cultivation." Dwight Perkins, Chinese scholar at Harvard, makes the same point, noting that the 10 percent growth in modern industry has been partly at the expense of agricultural lands next to the city limits, where most factories spring up.

Rivaling urbanization as a claimant on cropland is energy production. Hydroelectric dams can inundate vast stretches of rich bottomland, even as they add to the irrigated area. An electric generating plant can cover hundreds of hectares. More often than not, oil refineries and storage tanks are built on prime farmland along rivers and coastal plains.

Stripmining coal also reduces the cultivated area. Indeed, as the world turns from oil to coal, energy producers are coming into conflict with food producers. In the United States, where coal production is projected to climb steadily, some of the most accessible reserves of coal are by an accident of geography directly beneath some of the nation's finest farmland.

A public interest group study entitled "Who's Mining the Farm?" reports that "as of 1976, 81,981 hectares in 40 Illinois counties have been affected by surface and deep mining of coal." In Congressional testimony, the zoning administrator of Knox County, Illinois, indicated that stripmining threatened 284,000 acres of farmland in his county alone. Given the rich extensive resources of coal close to the surface in Illinois, the potential for disrupting food production in the heart of the corn belt appears great.

Where stripmining is already in full swing, hope lies in revitalizing ravaged agricultural lands. But while mining companies are now required by law to restore land to its original productive state, doing so may be impossible in many situations. In 1977, USDA reported that "Surface mining as practiced in much of the nation today either ruins farmland completely or reduces its production drastically." Eager to convince the public that stripmining does not jeopardize farmland, coal companies and utilities have launched advertising campaigns aimed at deflecting attention from key issues. Jack Doyle of the Environmental Policy Center observes that "while coal companies and utilities are eager to show that stripmined farmland can be returned to agricultural use, they fail to address the question of yield. Will 'reclaimed' cropland and rangeland be able to yield what they did before mining--bushel-for-bushel and pound-for-pound?" Even if the topsoil is carefully pushed aside before mining to be replaced afterwards, reinstating subsoil-drainage patterns is no easy matter.

If estimates of future cropland losses to urbanization are difficult to make, those of losses to the energy sector are even more so. But with or without hard statistics, we can see that to conserve energy is to conserve cropland. One offense to this obvious bit of wisdom is the automobile-centered transportation system that so voraciously consumes land. An enormous amount of U.S. cropland has been paved over for automobiles, millions of hectares of it just for parking spaces for the nation's 143 million licensed motor vehicles. But even this area pales in size when compared to that covered by streets, highways, filling stations, and other vehicle-service facilities. Added to auto-induced urban sprawl, these fixtures came at a high price, one too often paid at the supermarket.

How much cropland will be paved over, built on, strip-mined, or flooded over the remainder of this century is unknown, but if the projected growth in population and income should materialize, then urbanization, energy production, and transportation are certain to continue to encroach upon cropland. To be sure, the threat posed by this continuing conversion of cropland to nonfarm uses is hard to exaggerate. As former U.S. Assistant Secretary of Agriculture M. Rupert Cutler observes, "When farmland goes, food goes. Asphalt is the land's last crop."[9]

The Cropland Prospect

The adequacy of the future cropland base will be influenced by numerous trends and forces, many of which will offset each other. The conversion of cropland to nonfarm uses, excessive soil erosion, the addition of new land to the cropland base, the irrigation of new land, the diversion of irrigation water to nonfarm use, and the rate of cropland desertification and of desert reclamation--will all interact and take their toll.

With most of the world's good agricultural land already under the plow, the potential for expanding cropland provides little ground for optimism. In North America, the conversion of cropland to nonfarm uses over the past three decades has been only partly offset by the reclamation of new land through irrigation projects or forest clearance. In the absence of a concerted national effort to protect cropland from conversion to other uses, this net reduction in the cropland base may well continue.

In Western Europe, opportunities for developing new lands are negligible, while Eastern Europe has been hard pressed just to maintain its cultivated area over the last 15 years. In the Soviet Union, where farming has already been extended into marginal rainfall areas, further expansion will be limited.

In densely populated Asia, China has little unused land to bring under cultivation. Given China's extensive irrigation works, the opportunities for multiple cropping more land are also limited. India's cropland base is expected to increase little, if at all, but multiple cropping could increase markedly if the full irrigation potential of the Gangetic Plain is developed. The one Asian region that could sustain increases both in cropland area and multiple cropping is the Mekong Valley and Delta, assuming political conditions permit its development.

In Africa, the one country with a healthy potential for expanding its cropland is the Sudan, since it has developed only part of the Nile waters reserved to it by treaty with Egypt. To the south the principal hope for more farmland lies in opening the Tsetse Fly belt to cultivation, provided that the disease-carrying fly can be eradicated.

In Latin America, croplands could be created by plowing up some grasslands, though doing so would reduce grazing capacity. In central Brazil, a belt of land--the Cerrado--bordering the southernmost regions of the Amazonian forest is now being brought under cultivation, though its inherent fertility is not exceptionally high. Within the Amazon basin, numerous isolated pockets of potentially productive cropland await development, but the investment in infrastructure required to exploit them could prove prohibitive. In 1970, Brazil launched with great fanfare the TransAmazon Highway and an accompanying colonization scheme. The goal was to settle a million families along the highway by 1980, most of them from the drought-stricken, poverty-ridden Northeast. As of 1980, only 7,000 families have been successfully settled, the government is phasing out its colonization scheme and there are doubts that the highway will be completed. Crop insects and disease, deteriorating soils and costly road maintenance are contributing to the project's demise.

Although attempts to expand the globe's cultivated area will be numerous, both government efforts and the initiatives of individual farmers will be offset by ecological backsliding. Well before the end of the century, for example, the topsoil will be gone from recently opened hillside plots in the

Andes, the highlands of east Africa, and the foothills and rugged valleys of the Himalayas, and these lands will have been abandoned. If reliable worldwide data were available on excessive soil erosion from cropland (as opposed to total erosion), and if this were then converted into cropland equivalent as was done earlier for the United States, it would likely show the loss of several million acres yearly.

Although land hunger has never been greater, the amount of cropland abandoned each year as economic pressures interact with ecological forces may also be at a record high. On balance, it is difficult to envisage an increase in the cropland base of much more than 10 percent by century's end. With projected population increases, this modest increase would leave us in the year 2000 with only .13 hectare of cereal land per person, well below the .17 hectares we each now have. (See Table 2-1.)

Table 2-1. World Population and Area in Cereals, 1950 and 1980, With Projections to 2000

Year	Population (billions)	Area in Cereals (million hectares)	Area Per Person (hectares)
1950	2.51	601	.24
1980	4.42	753	.17
2000	6.20	828	.13

Source: United Nations, U.S. Department of Agriculture, and author's projections.

While the cropland base is likely to expand modestly over the next two decades, its inherent productivity seems certain to decline as a result of excessive erosion and marginal land additions. Although these losses are not sufficient to prevent future increases in yield per hectare, they will likely slow the rate of gain. Satisfying the two-thirds increase in world food demand projected by the United Nations for the remainder of this century would require land productivity to accelerate sharply.

Land Productivity Trends

In a world where 70 million new residents are added each year and where little fertile land awaits the plow, land productivity is the key to the food prospect. From the beginning of agriculture until World War II, productivity edged upward only slowly, sometimes remaining static for long stretches. Rice yields in nineteenth century Japan, for instance, were only marginally higher than those obtained during the fourteenth century. U.S. corn yields during the 1930s were no higher than those during the 1860s, the first decade for which reliable yields estimates are available.

Following World War II, however, crop yields began to rise in a sustained, systematic fashion in virtually every industrial country. During the sixties, the introduction of the fertilizer-responsive varieties of wheat and rice enabled many Third World countries to raise food output per hectare too. Between mid-century and the early seventies the steady rise in cereal yield per hectare was one of the most predictable trends in the world economy, increasing at an average of 2.2 percent annually. Since 1970, however, the rate has fallen to 1.6 percent per year as idled (and usually marginal) U.S. cropland was returned to production and as the price of energy intensive inputs rose. (See Table 5-4.)

Numerous factors appear responsible for the drop in the rate at which yields have been increasing. In the great majority of situations, the new cropland being brought under the plow is of lower quality than the land already in use. Often the marginal land added replaces the prime land that is continually being withdrawn for nonfarm uses, leading to a reduction in land quality that is not evident from data on overall cropland area.

Table 5-4. World Production Harvested Area and Yields Cereals, 1950-80

Year	Production million metric tons	Area million hectares	Yield metric tons per hectare
1950	631	601	1.05
1960	863	682	1.26
1970	1137	704	1.62
1980	1432	753	1.88

Source: U.S. Department of Agriculture

Also sapping farmland productivity is the reduction of fallow area in dry land farming regions. As world wheat prices rose between 1969 and 1974, U.S. summer fallow land dropped from 17 million hectares to 13 million. This shrinkage led Kenneth Grant, then head of the Soil Conservation Service, to warn farmers that the other side of the lure of record wheat prices and short-term gains is the sacrifice of the land's long-term productivity. The stresses are evident in other dryland farming regions as well. The U.S. Agricultural Attache in Moscow reported a strikingly similar reduction in fallow land in the Soviet Union from 17 million hectares to 12 million after the massive crop shortfall and heavy imports of 1972.[13]

In tropical and subtropical regions, where fallowing has evolved as a method of restoring fertility, mounting population pressures are forcing shifting cultivators to shorten rotation cycles and thus to undermine the land's productivity. For example, in Nigeria, where farming has been expanded onto marginal land and fallow cycles shortened, cereal yields have been falling since the early sixties. A World Bank study of Nigeria reports "fallow periods under shifting cultivation have become too short to restore fertility in some areas." In some locales, the original cropping cycle of 10 to 15 years has already been reduced to five.

While the shortening of fallow cycles is reducing land productivity in some countries, soil erosion is reducing it in others. One of the big unknowns facing agricultural analysts is how rapidly excessive soil erosion will reduce land productivity. If this erosion continues in the U.S. Corn Belt, the U.S. Department of Agriculture estimates "that potential corn and soybean fields would probably be reduced by 15 to 30 percent on some soils by the year 2030." A study of the erosion of Piedmont soils in Georgia showed a six-inch loss of topsoil reducing average fields 41 percent. A similar degree of erosion in West Tennessee led to a 42 percent drop in corn yields.

Some agricultural scientists believe that inherent biological constraints will eventually restrict crop yield per hectare. One analyst of this issue, Louis Thompson, Associate Dean of Agriculture at Iowa State University, has plotted the average corn yields recorded on several experimental stations in Iowa from 1958 to 1972, as well as those achieved by the state's farmers. In the late fifties, the gap between average yields on experimental plots and those on working farms was wide, but by the early seventies it had virtually disappeared. In effect, the backlog of technology has been largely used up, and Iowa farmers are literally looking over the shoulders of the agricultural scientists working the experimental plots,

An analysis of the long-term historical rise of wheat yields by Neal Jensen, Professor of plant breeding at Cornell University, produced an even more sobering conclusion. Applying his findings to agriculture in general, he predicts that "the rate of productivity increase will become slower and will eventually become level." Jensen believes that plant breeders and agronomists in the more advanced agricultural countries have already exploited most of the potential for raising yields.

While enormous opportunities for raising cropland productivity exist in some countries, the outlook for further dramatic worldwide increases appears less hopeful now than at mid-century. Soil erosion is lowering the inherent fertility of perhaps one fifth of the world's cropland, while the backlog of new agricultural technologies in the agriculturally advanced countries is dwindling. Together, these two factors cast a formidable shadow over the prospect of a continuing rapid rise in land productivity.

Responding effectively to the cropland threats that are associated with mounting food demands poses a dilemma for farmers and governmental planners alike. Both economic pressures and political instincts encourage a short-term focus but pressures to wring too much out of the land in the short run can destroy it over the long run. Preserving civilization's foundation requires redoubled efforts to protect cropland from erosion and from conversion to nonfarm uses. Staggering as the challenge may seem, countries have pulled back from disaster's edge before. In the United States, an earlier generation overcame the Dust Bowl threat, and China's longest march may have been that on the road to agricultural recovery since 1949. The key to an effective worldwide response is a wider understanding of the effect of cropland conversion and topsoil loss on food prices.

Designing an effective program to halt soil erosion is in itself a major challenge. In the United States, the Soil Conservation Service has outlined a national plan that would bring the annual loss of topsoil down to a tolerable level. In addition to the conservation systems already in place, over one-third of the 413-million-acre cropland base urgently needs attention. Along with the 17 million acres that the Soil Conservation Service recommends be withdrawn from continuous cropping, 141 million acres of cropland are currently losing more than five tons of soil per acre every year. On these, some form of conservation tillage such as terracing, contour farming, strip-cropping, or minimum tillage is needed.

As of early 1982, the program outlined by USDA soil scientists remains only a proposal; it has not yet been adopted, although there is growing public recognition of the problem. Whether this program will be formally proposed and agreed upon depends on the support of the Reagan administration and Congressional leaders. It is the type of plan that a majority of the world's countries now need if their soils are to be stabilized.

Making soil conservation economically attractive to farmers may be even more difficult than designing an effective program to halt soil erosion. Detailed studies on the economics of soil conservation show that the short-term costs often exceed the short-term benefits. A study in southern Iowa found that the immediate costs to farmers of controlling erosion so that it would not reduce inherent productivity would be three times as great as the benefits. Similar financial balance sheets influence the behavior of Third World farmers, who can muster little concern about the future when their very survival is at stake.

In these circumstances, only the willingness of governments to share the costs of the needed measures--terracing, contour farming, strip-cropping, cover cropping, rotating crops, fallowing, and planting shelter belts--will induce farmers to fight soil erosion. The USDA estimates that over the next 50 years the implementation of these programs would require $103 billion in budgetary appropriations, or roughly $2 billion per year.

Time is also at a premium--time to lay the groundwork for such massive financial investments and time to train people to do the job. Traditional approaches to financing and training are too leisurely and will not suffice. More promising is the deployment of paraprofessionals. In Third World countries, the best approach may be for village leaders who are themselves farmers to receive training in soil conservation practices during the off-season so that they can help design and administer local soil-conserving plans.

Even though soil scientists can chart a national plan of action in detail, as they have in the United States, they cannot call forth the political support needed to fund and administer such a plan, in part because adopting soil-saving measures would in many cases run counter to the short-term economic interests of farmers and consumers. The cost to farmers of adopting the needed measures will raise food production costs and prices. To the extent that severely erosion-prone land is withdrawn from crop production and converted to grass or trees, food supplies will be reduced and prices will rise in the short run. Difficult though this might be to accept, the alternative is to do nothing and face soaring food costs over the long term as soils deteriorate.

Indeed, U.S. soil scientist R.A. Brink and his colleagues, writing in Science, question whether in a predominantly urban society anyone can generate needed support for soil conservation until the food crisis deepens. Moreover, even with proof of the long-term benefits of conservation and national plans to preserve soils, marshaling such support will take time. As B.B. Vohra, a senior Ministry of Irrigation official in India, points out, "An informed public opinion cannot...be wished into existence overnight. A great deal of painstaking and patient work will have to be done to wipe out the backlog of ignorance, inertia, and complacency."

The missing ingredient in current unsuccessful responses to the growing menace of soil erosion is a political will grounded in awareness. People know that food prices are rising, but most don't know quite why. An understanding that soil loss eventually means lower productivity, which in turn means less and costlier food, is needed if a national soil conservation ethic is to be adopted. Given the necessary information, more people will understand not only the compelling environmental reasons for adopting such an ethic, but also the economic payoff in implementing a program based on it.

The global cropland base is also threatened by the conversion of agricultural lands to other uses. Rising food prices make it clear that agricultural land can no longer be treated as an inexhaustible reservoir for industrial development, urbanization, and energy production. On the contrary, cropland must be viewed as irreplaceable--a resource that is paved over, built upon, or otherwise taken out of production only in emergencies and only after public deliberation and choice.

Historically, the marketplace has functioned as the arbiter of land use. Unfortunately, though, the market does not protect cropland from competing nonfarm interests. For that, careful land-use planning is needed at both the national and local levels. Whether in the form of legislation, government decrees, or such incentives as differential tax rates, the only defenses against the ultimately destructive opportunism of the marketplace are land-use planning and restrictions.

Until recently, most governments have stayed out of land-use planning. But many that have rationalized their neglect have overlooked the fact that both national and local governments shape land-use patterns--whether or not they view themselves as planning authorities. Within the United States, scores of national policies and over 20 federal agencies have directly or indirectly influenced land use through decisions on matters ranging from highway construction to irrigation subsidies.

A study by the Organisation for Economic Co-operation and Development (OECD) comparing land-use planning internationally reported that Japan is the only country with comprehensive zoning nationwide. In 1968, the entire country was divided into three land-use zones--urban, agricultural, and other. In 1974, the plan was further refined to include forests, national parks, and nature reserves. Acutely pressed for space and land-based resources, Japan has faced the issue first, developing a model that other countries can emulate. Indeed, even though its 117 million people are crammed onto a mountainous sliver of land smaller than California, Japan manages to produce an exportable surplus of rice, the national food staple.

Among the Western industrial countries, France appears to have by far the most effective farmland preservation program, thanks to the work of local Sociétés d'Aménagement Foncier et d'Etablissement Rural (SAFERs). SAFERs were authorized in 1960 as nonprofit organizations and were empowered not just to buy and sell farmland, but to preempt any sale. As of 1981, SAFERs cover virtually all of France. Between 1964 and 1975 they purchased 2.1 million acres of land and sold 1.7 million acres. Although they buy only about 12 percent of the agricultural land up for sale, their influence is far greater. Even when not exercised, their right of preemption has an important effect on market behavior.

Within the United States, national land-use planning remains rather rudimentary. So far, the government has done little beyond setting aside national parks, forests, and wildlife reserves. Most zoning is local, consisting largely of restricting the use of land for commercial purposes. Although local government efforts to protect agricultural land were nil before the seventies, several states have since launched programs to preserve farmland.

One of the first steps that states customarily take to preserve farmland is to enact differential tax-assessment laws, so that no matter what alternative worth farmland might have it is assessed for its value in agricultural use. As of early 1980, laws or constitutional amendments in 46 states enabled local governments to assess taxes on such a basis. In New Jersey, passage of the Farmland Assessment Act of 1964 slowed the conversion of farmland to other uses. "If farmland in New Jersey were to be taxed at the going rate for urban and suburban residential and industrial uses," says New Jersey Secretary of Agriculture Phillip Alampi, "it would be impossible to maintain agriculture as a business in the state."

A second technique for preserving farmland--the purchase of development rights from farmers--surfaced in the early seventies to a warm reception. This approach involves getting two assessments for the value of land--its value for development, and its value for farming. The differences between the two, the "development rights" for the land, can be purchased from farmers by either state or local governments and held in perpetuity, regardless of how many times the property changes hands. Once such development rights have been purchased, land can be used only for farming. The principal disadvantage of this approach is its high cost. Yet the process is cumulative and even though it starts on a small scale the area protected expands with time.

Zoning is also used in the United States to prevent the conversion of farmland to nonfarm uses, though this approach is useful primarily in heavily rural communities. In Black Hawk County in northeastern Iowa, for example, the county zoning plan both preserves prime farmland and permits well-conceived residential development on land of lower agricultural productivity. Under this plan, prime farmland is defined as that which yields the equivalent of 115 bushels or more of corn per acre. On it, all residential development is prohibited.

Of course, many countries must solve more basic problems en route to resolving land-use conflicts. In some areas--in Latin America, for instance, where peasants struggle to continue ruinous cultivation on mountainsides while cattle graze in the valleys--destructive land-use systems have evolved as a result of skewed landownership patterns. Where prime cropland is in grass and where steeply sloping hillsides that should be grass are being plowed, the key to more sensible land use hinges on a reform of these feudal landholding systems.

No two countries or communities can approach land-use decisions in precisely the same way; each must work out the details of programs to preserve cropland. Yet all face the need to order priorities among competing uses. Croplands are the foundation not only of agriculture but of civilization itself. Indeed, civilization cannot survive a continuing erosion of the earth's cropland base. A world that now has over four billion human inhabitants desperately needs a land ethic, a new reverence for land, and a better understanding of the need to use carefully a resource that is too often taken for granted.

Mr. **Bonker**. Thank you, Mr. Brown. Again we appreciate your brevity. It will give us more time for questions.

I also note in the Washington Post yesterday an article about your book. We will do a little plugging here.

Mr. **Brown**. Thank you.

Mr. **Bonker**. Six Steps To A Sustainable Society.

Mr. **Brown**. That is actually a Worldwatch paper that my colleague Pamela Shaw, who is here today, and I did. It is adapted from the book. We pull out the prescriptive material, and one of the areas which we prescribed is what needs to be done about protecting the global crop base.

Mr. **Bonker**. I should like to have time to read it.

Dr. Prance.

STATEMENT OF GHILLEAN T. PRANCE, VICE PRESIDENT FOR RESEARCH, NEW YORK BOTANICAL GARDEN

Mr. **Prance**. My subject is tropical forests and diversity. At Stockholm this was rather skirted around, too, because of the unwillingness of some of the tropical forest countries to discuss their own problems. I think one of the items of progress that has been made since then is greater willingness to discuss this and take part in forums.

Mr. **Bonker**. I wonder if they have any idea what they have lost in forestlands in the last 10 years because of inaction.

Mr. **Prance**. I don't think they have an idea of the size of the problem yet. They are ignoring it purposely.

Mr. **Bonker**. Perhaps it could be presented in Nairobi.

Mr. **Prance**. Yes, I hope so.

Since Stockholm there have been a lot of good reports that have drawn attention to the tropical forests, both national and international reports like "Research Priorities in Tropical Biology" by the National Academy of Sciences, and culminating perhaps in a 3-day conference at the State Department on biological diversity. These have all stimulated an increased awareness of what is going on in the tropical forests.

I see these reports and what they say is encouraging to anyone who is interested in them. But the destruction has continued unabated. It has not eased off at all, and I think one of the needs that perhaps this country could provide is documenting this.

There is satellite imagery available. Each person who talks about tropical forests throws out different figures in each report published as to how much there is. I think we have the technology to do this, to show how much forest has already been destroyed.

The Brazilian Space Institute at the moment claims 1.75 percent of the Brazilian forest has been destroyed. Obviously, that is not the right figure as we can see by any visit to the Amazon.

The other important point about this destruction that is going on is destruction not leading to sustained yield systems. So what Mr. Brown was talking about, soil erosion, is continuing.

We have seen many failures since Stockholm, such as failure of the colonization program and the Trans-Amazon Highway, cutting of timber in certain areas without reforestation. The large cattle pastures that have been put in the Amazon region that are now abandoned at this stage. These are all examples of deforestation without building something giving a stable yield.

Mr. **Bonker**. Is it possible to have a sustainable yield program for hardwood as it is with softwood?

Mr. **Prance**. Yes, it is.

Mr. **Bonker**. Is it economically feasible?

Mr. **Prance**. Yes, I think it is economically feasible. The problem is with the diverse tropical forests. What do you do when you have so many species?

Mr. **Bonker**. Certain softwoods can be grown like crops. If you get into some of the diversified species, it is more of a natural growth.

Mr. **Prance**. You can improve it and maybe have a diverse forest, but not as diverse as a natural forest, and simulate the natural ecosystem much more than growing a monoculture in the tropics.

Mr. **Bonker**. How do you stimulate a natural ecosystem?

Mr. **Prance**. To start with, you don't cut it all off and burn it, and cause loss of all the nutrients out of the system.

Mr. **Bonker**. That is where you get into the economic practicality of reforestation. If you cut it off and burn it down, you allow natural regeneration and also plant trees.

Mr. **Prance**. Yes. Yes, indeed. You harvest it, but you replace it with some useful trees, more useful trees than it contains.

Mr. **Bonker**. Commercially speaking, useful?

Mr. **Prance**. Yes.

Mr. **Bonker**. If Weyerhaeuser is going to plant a 40-acre plot of Douglas fir trees, it has a commercial value to it and they go through their methods to achieve that level. But if you are going to develop a plot that has a diversified and kind of a natural regrowth, then I think it loses its commercial value. It becomes unprofitable.

Mr. **Prance**. One of the things we must do is use some of their already degraded land to reforest with trees that can be harvested commercially. There is so much degraded land that can probably be upgraded by some of the trees we can grow in monocultures in certain areas. It is not all uniform.

Mr. **Bonker**. A lot of it just happens naturally. I mean it is not planted like corn. There is a natural regrowth in the Northwest, anyway, of hemlock and cedar, even.

Mr. **Prance**. It is very different in the Northwest than it is in the tropics where you have such diverse forests. I think, continuing here, that one of the things that research has shown since Stockholm is that diversity is real. I analyzed a hectare of forest near Brazil where there were 236 species of trees. That gives you an idea of what the problem is in exploitation of it, but also in the need to conserve the genetic resources that it represents.

And at the same time entomologists from the Smithsonian working in the same area calculate there were 42,000 species of insects per hectare in the forest. That is unbelievable. More important, the research has shown in the last few years the interactions between these organisms, the interdependence, the soil organisms linked to the trees, the pollinators up in the tops of the trees, the things that disperse the fruits on the forest floor, and understanding this interaction is what is leading us to be able to see where there may be sustained systems possible.

The maintenance of this diversity is certainly our best insurance for the future of mankind on this planet. The tropical forests, there are so many undiscovered resources obviously there. We don't know what foods, drugs, et cetera, are there.

Who would have expected at the time of Stockholm that a new species of corn would be found in Mexico, yet that has been found and is being used to breed into corn various disease resistant genes, and maybe eventually its perennial quality will be useful.

Also, the diversity of the tropical forest is the very thing that will lead us to find things that will grow in sustained yield. For example, working with some of the Indians, they have crops that grow under the canopy of the forest without cutting it all down. A potato growing in the low light intensity of the forest floor is the kind of example I am talking about.

Also, this diversity adds a certain quality to life that I don't need to mention. Government concern should certainly be to support programs and encourage programs that are working toward sustained yield, because we are not there yet and we must do so in the tropical forest.

AID recently initiated some programs that have been doing this, and I think it is very important to encourage and increase them.

Mr. Brown was talking about the level land as opposed to the slopes in his agricultural comparison. Agriculture on the flood plains in some areas of the Amazon is nearing sustained yield. It is the uplands where the soils are being washed away and the forest is being destroyed when you cut it down. There is a very big difference between the flood plain in the tropics and the uplands. There is also a difference in diversity. It is not so diverse in the flood plain.

Another thing all the reports have pointed out that I think is very important is that so much of the basic inventory of this diversity is not known. We have probably got about a sixth of the world's organisms cataloged so far with a basic legend name, and there are only about 1,500 practicing taxonomists who are doing this. I think we need to emphasize this inventory in the training of people who can both do the work but are aware of the applied research implications of their research as well.

Another thing that Government policy should be doing is encouraging whole habitat conservation, which is the only way of preserving diversity. Not focusing so much on individual species as on the whole habitat, how these species are interacting. So we need to establish support efforts to establish reserves to protect them and to manage them.

Many of the lesser developed countries are prepared to set aside reserves but they don't have the funds to protect and manage them. We can certainly help them there.

In this light, we need to cooperate much more fully with the United Nations environmental program, FAO, Man in the Biosphere, and IUCN. And last, I think education at all levels in this tropical forest area is essential. The United States has experts that can be sent but funds are being continuously cut so that fewer are able to go.

Thank you very much, Mr. Chairman.
[Mr. Prance's prepared statement follows:]

PREPARED STATEMENT OF GHILLEAN T. PRANCE, SENIOR VICE PRESIDENT FOR SCIENCE, THE NEW YORK BOTANICAL GARDEN, EXECUTIVE DIRECTOR, THE ORGANIZATION FOR FLORA NEOTROPICA

Mr. Chairman, members of the House Affairs Subcommittee on Human Rights and International Organizations. My name if Ghillean T. Prance, I am a botanist who has been conducting research on the vegetation and the plants of Amazonia for the last 19 years, my work has involved extensive expeditions all over Amazonia. I am also Executive Director of the UNESCO - Category B - non-governmental organization, the Organization for Flora Neotropica which seeks to publish definitive monographs about the plants of the New World tropics. Since Amazonia is one of the most species diverse tropical forests in the world and is also the world's largest tract of tropical rain forest, it is vital that this region be considered in any discussion of biological diversity.

Progress since Stockholm : Numerous Reports

Since the Stockholm Conference there has been a spate of reports concerned wholly or partially with the fate of tropical rain forests of the world. These have contained many good suggestions and should now pave the way for further action. The most notable of these reports include:

1) Conversion of Tropical Moist Forests. 1980. Prepared for the Committee on Research Priorities in Tropical Biology of the National Research Council. Published by The National Academy of Sciences.

2) Research Priorities in Tropical Biology. 1980. Also prepared by the National Research Council of the National Academy of Sciences.

3) Tropical Forest Ecosystems . 1978. A state-of-knowledge report prepared by UNESCO/UNEP/FAO. Natural Resources Research XIV. UNEXCO, Paris, 639 pages.

4) World Conservation Strategy

5) The World's Tropical Forests. 1980. A U.S. Policy, Strategy and Program. U.S. Interagency Task Force on Tropical Forests. U.S. Department of State, Washington, D.C.

6) Global Future: Time to Act. 1981. Report to the President on Global Resources, Environment and Population Council on Environmental Quality, U.S. Department of State.

The purpose of listing these reports is to show that much analysis of the situation of tropical forests has taken place over the last few years. However, little new action in the tropical forest areas has occurred, and the destruction has continued at unprecedented rates.

These reports have been useful in that they have generated deeper concern. For example, an encouraging fact is the occurrence of a Strategy Conference on Biological Diversity, in November 1981 sponsored by the State Department and seven other government agencies. The conference established a working group to develop specific goals for each government agency or program. This united approach could certainly increase the efficiency of U.S. involvement in tropical rain forest areas.

Tropical Forest Diversity

Research during the last decade has produced increased data about the amazing diversity of tropical forest. For example, a two and one-half acre (1 hectare) area of tropical rain forest in Central Amazonia which I surveyed contained 236 different species of trees. Imagine that diversity compared to the forests of the Eastern United States where 12 species of trees in a forest would be high. Furthermore, one could survey another hectare next to the one studied and find a 50% difference in its 236 species. In the same general area of Manaus, Brazil, Smithsonian entomologist, Dr. Terry Erwin calculated that an average hectare of forest has 42,000 species of insects in the canopy. There are an estimated three million biological species in the tropical areas of the world (as compared to 1.5 million in the temperate regions), and of these only one-sixth or about 500,000 have been classified, that is given a scientific name. On every expedition which the New York Botanical Garden makes to tropical forest areas we bring back numerous undescribed species that yet remain to be classified.

Perhaps one of the most interesting discoveries from the tropics in the last ten years since the Stockholm Conference is that of a new species of Corn, Zea diploperennis, discovered in Mexico by botanists from the University of Wisconsin and their Mexican colleagues. This new species could be most important to the corn-breeder since it is perennial, that is it does not die each year like an annual. It is already being used to introduce disease resistance into existing varieties of corn. This potentially useful species could easily have been lost since it was found in already much disturbed area of Mexico. Countless other useful species will be lost if we allow the continued destruction of the tropical rain forest where much of the world's biological diversity exists.

One of the most compelling reasons for protecting the tropical forests is the interdependency of the different organisms. The whole forest ecosystem is linked together by all the different interactions that occur in the forest. For example, the Brazil nut tree (Bertholletia excelsa) is a large tree of the Amazon rain forest. It produces the much used nuts in large woody fruits that drop to the ground. In order to bear nuts, the flowers up in the canopy of the forest must be pollinated by a certain species of bee. Fourteen months later when the fruits fall to the ground they are opened by a large rodent, the agouti, that has very sharp teeth. The agoutis remove the individual nuts which are arranged inside the fruit like segments of an orange. They bury the nuts just as squirrels bury acorns in North America, and then forget where some of them have been hidden. These can then germinate and produce new trees. Thus to produce the Brazil nuts and to reproduce itself, the tree is dependent upon a bee in the top of the forest and a rodent on the forest floor. This is typical of the many interactions that link each forest organism together. If one part of the cycle is destroyed then the other organism is in difficulty. The destruction of forest insects with chemical can then severely affect the trees. The whole forest is interdependent.

Why Save the Diversity?

The Brazil nut example provides the first reason, that each organism is dependent on others. To reduce diversity by removing any species can affect others. Trees depend on soil organisms to recycle their nutrients, animals depend on trees for food. In the Amazon even a large number of fish are vegetarian and depend completely on the fruit or leaves of trees which they obtain by swimming through the forest when it is seasonally flooded.

Diversity is the key to the discovery of new plants of potential use to mankind. Twenty-five percent of all prescriptions in the United States during the period 1959-1973 contained substances derived from higher plants. It is estimated that the cost of drugs derived from higher plants in 1980 was about $8.116 billion. Add to this another 12 percent of prescriptions from fungi and bacteria and six percent from animals means that biological organisms account for over 40 percent of all prescription drugs. Less than ten percent of the world's total 250,000 higher plant species have been examined at all for their basic chemical constituents. There are certainly many useful unknown drugs hidden in the diversity of the tropical forest that will compare with the value of the anticancer drugs vincaleukoblastine and leurocristine quite recently discovered in the Madagascan tropical periwinkle (*Catharanthus roseus*) and now about a $35 million industry. If we consider some of the other potential uses for plants in food, fibers, flavors, and fuels, we have the best reason for conserving diversity. The sap of the Amazonian tree nhamuí, *Nectandra elaiophora* is so combustible that it will run a gasoline engine. The oil from the fruit of a very common Amazonian palm, babassu (*Orbignya*) was used in diesel engines in World War II. It is one of the largest underexploited resources of Amazonia, since it also produces a comestible oil similar to olive oil. One of the most important future uses of tropical forest diversity could be in fuels. The diversity must be preserved so that we can discover these multiple uses.

Another compelling reason for preserving diversity is that of the aesthetic value of natural diversity. The human race has an inborn appreciation of ecological diversity probably derived from evolving in the species diverse savanna habitats of East Africa. The surroundings that still maintain the birds, colorful flowers and butterflies, and elegantly shaped trees are still considered an important part of quality living by the human species.

Destruction of diversity continues unabated

The ten years that have elapsed since the Stockholm Conference have also been the ten years in which destruction of tropical forests has occurred at a rate unprecedented in history. For example, the Brazilian TransAmazon highway initiated in 1970 began with a colonization program that failed. Since 1975 the area has been the focus of giant cattle ranching projects sponsored by large national and international companies that were given huge tax incentives. A hectare of forest with a diversity of many thousands of biological species, 450 trees, many of which are useful, is cut and burned and replaced with pasture of one or two species of grass and a single cow. In Amazonia, the cow is a lean, bony animal capable of producing low grade meat for hamburgers or corned beef only since it does not thrive in the region. Today there are many areas of abandoned pastures, full of poisonous plants that have made ranching difficult. All that biological diversity has gone up in smoke to yield an unproductive area because the basic ecology of the region was ignored by planners. It is estimated that in the next twenty years 15 - 20 percent of all the earth's species will become extinct if environmental destruction continues at the rate in which it did in the decade of the seventies. In addition to this loss of genetic diversity soil erosion is enormous, rivers overflow their banks at great distress to human populations because the forest is no longer there to control the flow of rainwater and local climate patterns begin to change. For example, Brazilian scientist Eneas Salati has estimated that over 50% of the rainfall in Amazonia is caused by the evaporation of water from the forest trees through the process of transpiration. To remove the forest is to reduce rainfall by a potentially disastrous amount.

Utilization does not necessarily mean destruction

The type of utilization projects of forest areas that I have described above are carried out without regard to the ecological constraints, and ignoring their deleterious effects on species diversity. Every effort should be made to halt projects that carry out indiscriminate cutting of tropical forests and these should be replaced by projects that emphasize sustained yield. The entire tropical forest region cannot possibly be kept as a giant reserve for biologists to study permanently. Yet it is possible to plan development in such a way that the diversity of species is conserved.

1) stop all indiscriminate cutting of virgin forest areas and allow deforestation only in areas and in projects where sustained yield is possible.

2) use the vast areas that are already degraded for reforestation with useable species. This can save using large tracts of intact forest.

3) use only the areas that have some possibilities for continuous production. For example, in Amazonia the vast area of seasonally inundated

floodplain has much potential for agriculture because the soil is enriched annually by alluvial matter. It is quite different from the uplands. However, use must be balanced with the needs of the vegetable eating fish. To remove all floodplain forest would destroy the tree species that are confined to that area and would also destroy one of the regions best sources of protein, the fish. A careful balance between floodplain and fisheries must be maintained.

4) the discovery of alternative little used plant and animal crops as substitutes for those that are doing the damage. For example, if cattle are not working why not use native animals like the large pig-sized rodent, the capybara, that is already being farmed experimentally in Venezuela? Water buffalo are proving much more viable in the Amazon delta region rather than cattle. They could be used much more. There are numerous plant crops that could be used. The babassu palm as a source of oil already grows in large natural stands. It is then likely to flourish in monocultures, and a breeding program could quickly improve its yield qualities. Various useful plants can be grown on marginal lands that are not suitable for conventional crops. For example, various fuel plants such as fast growing trees that yield wood alcohol or useful desert plants like Guayule that yields rubber.

It is important for any government policy to encourage a rational balance between utilization and conservation. The tendency immediately after the Stockholm Conference was a polarizing of the two approaches. More recently the situation is improving and scientists who were only concerned with conserving the natural diversity are also looking for the potential economic uses of the plants or animals with which they deal.

There is a great need to encourage further research into the utilization of underexploited tropical organisms.

Possible Governmental Contribution

Although the United States possesses only one percent of the world's tropical rain forests, it is strongly in the interests of this country to be concerned about the diminishing diversity and loss of potential useful organisms, about the effects of deforestation on world climate, and the loss of potentially productive areas through mismanagement. The United States has already been deeply involved in tropical rain forests both in a research and an exploitation capacity, and more recently through several AID projects.

Above all government policy must promote programs that are designed to conserve biological diversity, both through the establishment of protected zreas and the rescue of species in gardens and zoological parks outside their natural range, and through the encouragement of wise land use practices that are based on sustainable yield methods. Some important ways in which this might be done include:

1) the stimulation of accelerated rate of inventory of tropical organisms as called for in all the reports cited in the first section of this statement.

2) increase greatly the funding of research on tropical forests, tropical ecology, sustainable agriculture, economic botany, ethnobotany and other relevant areas.

3) Insist on environmentally sound standards in U.S. Government and Private Industrial projects in the tropics with compliance to the same environmental standards that exist at home.

4) encourage programs in the International Organizations that stimulate local governments to be more cautious with their resources through educational programs, dissemination of information and the stimulation of research.

5) encourage AID programs that are based on sound ecological principles and that concentrate on sustained yield programs and address the environmental impact of all projects. I am encouraged to see the environmental emphasis of the recent amendments made to Section 118 of the International Security and Development Cooperation Act of 1981, which were made as a result of the Global 2000 report.

6) encourage programs of education at all levels for residents of the tropics both through training in the United States and the loan of U.S. exports to the tropical countries. The emphasis of such education should be training in tropical forest management. There are many avenues for training such as through universities, private institutions, the loan of government officials and the support of FAO exports program etc.

7) a greater cooperation between government and private industry is needed in the tropical areas.

8) A much greater use should be made of the potential of satellite data for monitoring the rate of destruction and the environmental change caused by deforestation. Much of the data in reports is based at the best on well educated guesses, yet there are many data collected by satellite that are not at present readily available to the scientists and educators most concerned with the problems of deforestation and the maintenance of biological diversity.

9) A much greater effort is needed to support and expand the Biosphere reserves program of UNESCO. Given the current rate of deforestation, it is essential to create funds that can help developing countries to protect and manage their reserves as well as identify critical habitats. These countries are often willing to designate reserves, but they often do not have the funds to protect them or to develop a management program.

Mr. **Bonker**. Thank you, Doctor.

This subcommittee, as you know, conducted a series of hearings on tropical deforestation, the results of which provided us with an opportunity to amend the Foreign Assistance Act, to give some attention to U.S. policy and commitment in the future.

I would like to hear from you as to what you feel are the major contributing factors to tropical deforestation. In the context of what has always been a natural phenomenon in terms of fuel, and grazing, contributing to a declining resource versus an industrialized society and what the pressures are for deforestation.

Mr. **Prance**. What Mr. Brown was saying is very important. If our own house is not in order, it is difficult to tell other people what to do.

The main objective about tropical deforestation is that it is not leading to something that is sustained. I think that if the forest is cut down in development and we can sustain productivity, then the forest has not been sacrificed for nothing.

Mr. **Bonker**. We are on a program of sustained reforestation in this country. Sustainable yield is a concept that is now explicit in Federal law. It is being practiced by most of the States that have public ownership of forest lands. Most of the private corporations are fairly responsible. Not only that, but they have really led the way toward reforestation policies.

So we are doing a fairly adequate job of reforestation in this country, are we not?

Mr. **Prance**. Yes, we are; certainly.

Mr. **Bonker**. Then I don't understand your comment.

Mr. **Prance**. I include both agriculture and forestry in my comment on what is happening to our soils.

Mr. **Bonker**. Back to my original question. What do you see is the major contributing factor to tropical deforestation?

Mr. **Prance**. Without doubt increasing population pressures as the first and foremost.

Mr. **Bonker**. You agree with what Mr. Brown says about Africa and population pressures?

Mr. **Prance**. Yes, that is right. For example, the Trans-Amazon Highway was built to try to relocate the overpopulated northeast of Brazil, and so they were put in en masse along the Trans-Amazon Highway, and the upland rice culture did not work well and so instead of putting in 1 million families, in the end about 10,000 settled there.

I think that many scientists could have said that it wouldn't work on that type of soil. There are other areas where they are much more likely to get a sustained yield to feed that population. Not by deforesting the upland forest which is on such poor soil.

Mr. **Bonker**. A personal question. Could you give me an idea of the status of Mr. Ludwig's ambitious project?

Mr. **Prance**. Yes, apparently he has sold it to a Brazilian consortium for $300 million, having put in $1 billion.

Mr. **Bonker**. A good investment.

Mr. **Prance**. That is right.

Mr. **Bonker**. What does that tell you? It was a fairly ambitious plan, and he was able to back it with the resources but it just didn't work.

Mr. **Prance**. And if it hasn't worked with that backing, how will other projects be likely to work? I think there are a lot of things to learn from Mr. Ludwig's project, not only the failure of it but some of the research being done. He was in a hurry with this project because he was an old man when he started this project. I think he was over 70 when he started the project.

Mr. **Bonker**. Could you offer some editorial comments about people being over 70 taking on new items?

Mr. **Prance**. Not at all. No, but I referred to the speed of the results he required.

Mr. **Bonker**. The same thing in this article, Mr. Brown. It states—I am quoting you about the biological deficit financing to carry this metaphor a step further, "bringing it to the edge of an environmental crisis that is undermining the global economy."

Now I thought that was an interesting comment and it parallels what this subcommittee brought out the other day quoting other sources. There are several U.N. agencies that have reached the same conclusion. In fact, these agencies are actually rooted in economic concerns, not environmental issues necessarily. Their forecast had to do with the state of the world's economy for the future. But both concluded exactly what you said, and that is that the declining natural resources or degradation of our environment, however you want to characterize it, is in the least undermining the world's economy.

I thought that was a particularly interesting point. We had the administration spokespersons before us the other day, and they think in one-dimensional terms these days. If there is one way to appeal to an economic conservative, or conservative who views everything economically, the way that we might bring them over as believers in the environment is that somehow the environment has an economic dimension.

That is a rather lengthy way of getting to my question, but I wonder if the other members of the panel agree with that conclusion: that we are not talking merely about environment or environment degradation but we are talking about the economic dimension, or the consequences for the world's economy.

Mr. **White**. I don't think I would agree with that conclusion as it is stated. In this UNEP report on the world environment, when the editors came to the final review of what had been marshaled from around the world they concluded that the final chapter ought to be on the subject of peace and security, and in effect they judged that while there were serious problems of degradation in a variety of situations, such as the erosion of soils from semi-arid regions and the salinization of irrigated lands in arid areas, there was generally available the means of treating the deteriorating trends, and that the difficulties were not primarily economic but social and political. In country after country, as you looked at the situation, it was the lack of what Lester Brown called political will or capacity for, integrated action, that accounted for what was going on.

We found ourselves racking up the effect of this political instability on the capacity of the national governments to deal with problems that had been recognized and for which the correct measures were available. We found ourselves charting the increasing expenditures for armaments in developing countries and the degree to which these countries were so racked by political instability that they were unable to act.

I think you have a hard job, Lester, saying that it is deterioration of resources that accounts for much of the lack in increasing productivity. If you look at the record of the decade, agricultural production has continued to just about keep pace with population around the world. In Africa, to which reference was made, you have a continent in which there is probably more cultivable agricultural land per capita than in most other continents, and the problems are not so much the amount of land as the way in which the land is being used and misused.

If you look at the United States, we have to recognize that there have been a series of developments going on in which we are using somewhat less land to produce more. And people have been encouraged to think that they can keep up with population growth with the kinds of agrcultural techniques that they have been using.

You have to look, I think, deeper than just soil erosion, Lester, for what has been happening.

Mr. **Bonker**. You have to look deeper than just soil erosion.

Mr. **White**. Yes, and literally you have to look deeper because I don't believe you can explain land deterioration at the present time, either in the United States or in most of the humid and semihumid regions, just in terms of soil erosion. You can explain it only if you take into account in addition to soil erosion the effects of pesticides, herbicides, chemical fertilizers, and changed methods of tillage. It is a very complex situation, a whole set of inputs that have accounted for higher production per unit area steadily during this period, with some ups and downs.

What we don't know is how much these increased technological inputs have been masking a basic deterioration. Some of us think, and a whole group in the United States cooperating with scientists in other countries trying to look into this, that some of these other effects may turn out in the long run to be more significant than soil erosion in terms of reducing our productive base.

Now, that is a long answer to your question, but it is intended to point up the fact that it may not be a deterioration of the basic resource that in the short run has accounted for as much lack of development as some other things.

Mr. **Bonker**. Would you care to rebut, Mr. Brown?

Mr. **Brown**. It is not very often Dr. White and I appear to disagree on anything. One of the few studies I have seen that attempts to look at the entire range of issues that are affecting the soils, including all the ones that you mentioned, the soil erosion and other things, is a recent report done by the Government of Canada. I think it was in the Ministry of Agriculture but I am not certain. I got it just last week.

It is a very detailed look and it is revealing in that it does begin to identify a lot of things that we have not normally been thinking about as factors influencing the long-term productivity of the soil.

In the statement that you read that quoted from our Worldwatch paper, that in effect the world is on the edge of an economic crisis that is of environmental origin, we were not just looking at the decade since Stockholm, but looking ahead as well and recognizing that we depend, the global economy depends heavily on the basic biological systems, the forests, the grasslands, the fisheries and croplands. These systems provide all of the food, many of the raw materials for industry, indeed all except for minerals and petrochemicals. So what happens to these systems and their productivity becomes terribly important.

What we are engaging in now in our efforts to satisfy short-term demands is what I described as biological deficit financing. That is what deforestation is. We are beginning to consume part of the capital along with interest, if you will. We are, in substantial areas of the world, exceeding the sustainable yield of forests because of our need for firewood or lumber or building or whatever.

What we have focused on in the study and what that quote is based on is what happens if we are not able to address the accelerating loss of topsoil, the continuing conversion of cropland to nonforest uses, the shrinking of the world's forest by an area the size of Hungary each year, the pressures on oceanic fisheries, the overgrazing that is now extensive not only in parts of Africa but many parts of the world including on public lands of the United States and a lot of places in Colorado. And our concern is that we will not recognize the threat that these trends provide, and I would be quite prepared to argue that if we cannot arrest these trends that the world is going to be in deep economic trouble.

Indeed, I would argue that many of the stresses that the world economy experiences today—whether it is the bout we have had in recent years with double-digit inflation or the threat of double-digit unemployment in industrial societies for the first time since the depression or the problems many Third World countries are having—that many of these are being fed in part by environmental deterioration.

The anchovy fishery, which was once the largest source of foreign exchange earnings for Peru, for example, has now become a very negligible factor in their overall economy in terms of income and climate and foreign exchange. The tropical highlands of Thailand and the Philippines are clearly threatened by their own estimates and projections now. The grasslands in Africa—I could go on and on.

I think we are at a point where we have to recognize that environmental issues are not something you worry about when you have spare time and money you don't know what to do with. They are essential to the survival of civilization as we know it.

Mr. **Bonker**. That is a good concluding note. I shouldn't ask any other questions but, Dr. Prance, I am interested to hear from you. What about the international organizations, and what are they doing to help in education, particularly in Third World countries, about the need to protect their forestlands? I am talking about UNEP and other organizations to which we contribute, voluntary organizations.

We heard from the witnesses the other day that our bilateral programs through AID are attempting to highlight environmental concerns. Are these international organizations really effectively dealing with the problem of reforestation, or are they just publishing a lot of reports that nobody is reading these days?

Mr. **Prance**. They are publishing a lot of reports but they are doing a lot of effective work as well. Some of the work done by

FAO has resulted in good, practical work that has helped a lot of countries. Some of the practical work like that are things that are being cut more recently. I think we should be aware, what we should support in these organizations is some of the fieldwork as well as the reports. I think they have a very important role, these international agencies, especially UNEP and FAO.

Mr. **Bonker**. We always talk about tropical deforestation which rather limits our attention to Latin America and Asian countries, but with the state of forestry in Africa, in places like Kenya and Uganda, there is a different kind of problem. Are they experiencing a rapid depletion of forestry stores?

Mr. **Prance**. One of the reasons we talk about the difficulty is that there is less rain forest in Africa. A lot of Africa is savannah and it varies very much from country to country what is happening. What is happening in the northern part of West Africa is just as bad as anywhere else. The timbers, for example, have been mined by the French on the Ivory Coast, taking out timbers without replacing them.

A lot of savannah country is more a problem of where agriculture has come into it rather than forestry. So what Lester was talking about is applicable in Africa. The Congo basin, which is mostly under Zaire, is pretty intact rain forest, as rain forests go in the world. They have not got the development to really cut down their forests, so that is protecting the forest in Zaire.

Mr. **Bonker**. Don't let President Mobutu know because if he realizes there is commercial value to those forests they will be depleted in the next few years.

Mr. **Prance**. Yes, sir. One of the biggest problems in the African area is Madagascar where, again, the forests are just being cut down without any reforestation. Madagascar happens to have the most species, diverse and most important part of the African flora and fauna. There are so many species isolated there of great interest. We have lost already a lot of the diversity of that region through the deforestation of Madagascar.

Mr. **Bonker**. But you are stating the case of commercial exploitation versus natural phenomena?

Mr. **Prance**. Yes, I am. That has concerned me more than the natural.

It seems to me that Indonesia is one country now requiring advanced forestry practices for companies who come in. Weyerhaeuser has just split with Indonesia on their program there.

They are beginning to, and, in a way, reforestation is easier in tropical Asia where you have one plant family that dominates, and so there are many species in that family, the diversity is more easily managed there for reforestation than it is in parts of Africa and the near tropics.

Mr. **Bonker**. Dr. White, one quick question. You made reference to the need to strengthen the cooperation among scientists on international environmental problems. Dr. Malone, who spoke the other day, said that precisely, but we read in the paper the administration is withdrawing from the International Institute for Applied Systems Analysis, kind of a protest of sorts, I guess, of having any kind of relationship with the Soviet Union. Dr. Malone was very upset with that. Do you share that concern or do you think we ought to withdraw?

Mr. **White**. I think we should stay in it because I think it is one of the principal grounds open which scientists from Western countries can meet with those in the Eastern bloc. There is the International Conference for Scientific Unions, and some of those have gone right on with cooperative working arrangements that have been very productive. They don't cost us very much in dollars, but they yield us very large returns.

I would say one of the very interesting developments in the decade since Stockholm, in thinking about the global environment, has been the development of the recognition that we are dealing not just with CO_2 in the atmosphere, or ozone, or acid precipitation, but that we are dealing with a very complex interacting system in which humans have changed these interactions drastically.

About 10 percent of all the carbon that is produced now is produced by humans in contrast to the former plant production. About 50 percent of all the nitrogen that finds its way into the global systems is coming from artificial sources, energy plants, fertilizers. And about the same amount of sulfur is going into the atmosphere now from artificial sources as all nature, volcanoes, and soil deterioration produce.

So we have brought about a massive change in the relationships of these nutrients in the whole life support system. And a good deal of this recognition has come from cooperation of scientists, not only in the United States but Britain, particularly Sweden, West Germany, the Soviet Union. They have all had a major hand in developing and elaborating these understandings. We all stand to gain by what the Soviet Academy of Science produces on the global sulfur cycle, the Swedes produce on the global nitrogen cycle, or the Germans on the global carbon cycle. I think it is that kind of collaboration which is economical and is speedy in terms of accelerating the rate at which we deepen our understanding.

Mr. **Bonker**. One final question and I will preface that by asking, do you intend to go to Nairobi, to be there for the conference?

Mr. **Prance**. I will not be there.

Mr. **Brown**. No.

Mr. **White**. I intend to go to present this report I helped prepare. I will be going.

Mr. **Bonker**. The final question is 2 days ago when Dr. Malone appeared before the subcommittee, I asked him to grade the progress in resolving global environmental problems between Stockholm and Nairobi, and he gave us a grade of C-plus. So I am going to ask each of you, as former professors, or present professors, to grade our progress in resolving global problems in the last 10 years.

Dr. White?

Mr. **White**. Well, usually I give either a pass or fail grade. In this case it would be pass, but if you want something more quantitative than that, I would say about C to C-plus. I recognize that an intergovernmental organization becomes a very cumbersome organization.

Mr. **Bonker**. Don't attempt to grade the intergovernmental organizations.

Mr. **White**. And the rate at which they can act is very much affected by the political interactions and struggles among the big powers.

I think we have done moderately well on correcting some of the deteriorating aspects of the environment. We have been losing in other respects. I think the organizations have been doing a creditable but not a smashing good job. I think they should have more money and less staff. That would be the most effective way of supporting them at this stage—less employees and more opportunity to help other groups do what they ought to be doing.

I feel encouraged by what is going on. On the one hand, when I look at the total world political scene, I feel very discouraged by the way in which the political instability is standing in the way of carrying out measures that we all know are effective and needed.

Mr. **Bonker**. Mr. Brown.

Mr. **Brown**. I suppose the principal achievement since Stockholm has been the creation of a number of national environmental agencies as well as UNEP. As Gil White has said, a lot of initiatives have been taken by many governments and international organizations that are beginning to move in the right direction. But if the yardstick by which we grade is the adequacy of our efforts in terms of the human prospect, then I don't think I would give more than a D-plus.

Mr. **Bonker**. Dr. Prance.

Mr. **Prance**. I think in controlling deforestation of the tropics we certainly have failed in the case so I would give a D for that, but in planning what should be done, that exists in numerous reports of what we should do, we probably have maybe C-plus.

Mr. **Brown**. He is grading the reports.

Mr. **White**. I grade the action, not the report.

Mr. **Bonker**. I have been following whales and I give a B-minus on whales.

Well, you all get A's.

Thank you very much for being here and for contributing to our understanding of global environmental problems.

Incidentally, for your benefit and the benefit of those who follow you, we will attempt to put into finished form your contributions, your testimony, so that we can make available that information.

Mr. **White**. Could I say one word about that? I hope that the chairman will be able to do this because I am very much concerned about the fact that the United States has had a major role in shaping world thinking about the environment. It clearly had a major role along with the Swedes in Stockholm. It has been highly influential, although not as much as it would have liked to have been, in what has happened to the U.N. environment program.

I think it is very important at this stage that the United States be represented by a strong delegation recognizing the problems and with some sense of the policies that ought to be followed. It would be disastrous if the United States is represented by a delegation that says, "What we really want to do is cut out appropriations all the way around and withdraw."

Mr. BONKER. I think that is an important point, and we try to emphasize that when the administration appears before the subcommittee. The delegation will be led by an under secretary of state. He was at the Stockholm Conference and, I think, has a deep personal commitment. He was very helpful in restoring funding in proposed reductions in our contribution to UNEP.

So I feel fairly confident that as head of the delegation, Mr. Buckley will represent our best interests at Nairobi. But undoubtedly the issue will be the financial contribution from a lot of countries because our success will depend on specialized work in the various disciplines and supporting these agencies who are doing the work, especially with Third World countries. So we can't slacken that commitment, and hopefully it will be reinforced at Nairobi.

Thank you.

Gentlemen, your full statements will be in the official record. Again, we will try to have them prepared in document form so we will have them available for distribution at the Nairobi Conference. You are providing an important service not only to the subcommittee, I think, but for a number of organizations and people who are closely following this issue.

STATEMENT OF CLIFTON CURTIS, CENTER FOR LAW AND SOCIAL POLICY

Mr. BONKER. We will proceed with the second panel and we are pleased to have with us Clifton Curtis, Center for Law and Social Policy. I understand you are going to focus on the issue which we discussed the other day when the administration was before us—the U.N. Law of the Sea negotiations—I understand there has been some negotiation and some progress made in that area.

If you can summarize your remarks, the Chair would be grateful. Mr. Curtis, we will start with you.

Mr. CURTIS. Mr. Chairman, I appreciate the opportunity to appear before you today to discuss the status of the ocean environment. I am presenting my testimony in behalf of 13 national environmental and conservation organizations, each of which is listed in my prepared statement.

These organizations have long taken an active interest in protection of the marine environment, and they welcome this subcommittee's decision to review the status and health of our global environment on the 10th anniversary of the Stockholm Conference.

One area of particular concern at Stockholm was the health of one of the Earth's greatest common resources, the oceans. One of the goals of the Stockholm Conference was to protect the marine environment and its living resources against pollution and overexploitation. Three developments were deemed essential:

First, strengthened international research programs; second, a framework to insure legal and management responsibility for control of marine pollution; and third, the obvious need to develop sound conservation policies.

The worst case fears about the oceans expressed at Stockholm have fortunately not materialized. This is partly because many of the dire predictions made at that time were based on inadequate knowledge, and partly because some of the environmental trends that were signaling disaster 10 years ago have been held in check. Nevertheless, virtually all of the concerns expressed at Stockholm still loom large, and a host of new threats to the health of the oceans have been identified.

There is now general agreement that the oceans are more resilient than was once believed, but little agreement on the extent of that resiliency. There is no evidence of any irreversible pollution effects in the open ocean, but some scientists believe there may be effects that have gone undetected. It is clear that pollution has damaged some of the world's coastal areas, where marine life is most plentiful, but little agreement on just how severe the damage is. Consensus is also lacking as to the relative seriousness of pollution from various sources.

The concern at Stockholm over the overexploitation of living resources has proven to be justified; about the time that the conference was taking place, the world fish catch began to decline—for the first time in recent history. While it has since leveled off, the outlook is for limited growth.

In addition to pollution and overexploitation, several new threats to marine life have emerged. One is the physical modification of coastal habitats by industrial development. Another series of environmental issues has been raised because of a surge in interest in the exploitation of oil and gas and other mineral resources found in the seabed.

Technological advances have of course taken place over the last decade. Among the most significant is remote sensing from satellites to explore the ocean, including subseabed resources. However, our present technological capabilities are still inadequate to develop a real understanding of ocean dynamics. Pure and applied research and study is needed with respect to a number of important issues, including the effects of various pollutants on the marine environment, the incidence of land-based pollution, and the assessment of fishery stocks.

Perhaps the most significant development of the last decade with respect to the health of the oceans has been the concentrated effort to adopt agreements, treaties, and laws designed to protect and preserve the marine environment. The most important of these has been the effort to establish a universally acceptable Law of the Sea Convention that would create a comprehensive legal regime for the world's oceans.

That convention is currently in the final stages of negotiation, and it is the sincere hope of the environmental organizations that the United States will sign and ratify the convention. Other international treaties have been more limited in their scope, dealing with such matters as the dumping of wastes at sea, tanker safety, and pollution from land-based sources.

Some of the best examples of international cooperation have come at the regional level, sparked by the Regional Seas Programs of the United Nations environmental programs—(UNEP). Many people are hailing the Regional Seas Program as one of the major ocean-related successes of the decade. While long-term results are not yet visible, measures taken under the programs have, at the very least, prevented things from getting worse. The program has fostered agreement on a number of important principles, not the least of which are the value of collective action and the need for comprehensive planning and research.

The single most important specific legal development in the last 10 years has been the implementation of the 200-mile exclusive economic zone, EEZ concept. Within its EEZ, a coastal state has sovereign rights, subject to certain conservation standards, to explore, exploit, conserve, and manage natural resources, as well as jurisdiction to regulate marine research and protect and preserve the marine environment. This fact has significant implications for future attempts to address a wide range of marine environmental issues.

The efforts to develop a legal framework which the Stockholm conferees believed would be essential to the protection of the marine environment indicates that the spirit of cooperation urged at that Conference has not been ignored. There have been, however, problems with the development of laws for our oceans. For one thing, enactment of national marine environmental legislation has been particularly slow, largely because of a low degree of political commitment by some nations, stemming from a lack of financial and technical capabilities.

Second, some serious problems still remain largely unregulated, most notably land-based pollution. Third, the enforcement of laws which safeguard the marine environment leaves much room for improvement, and continues to be one of the most serious barriers to preserving and restoring environmental quality in the oceans.

Mr. Chairman, in my prepared testimony, I have addressed in some detail a number of specific areas of concern. These include: Pollution from land-based sources; vessel-source pollution; ocean dumping; exploitation of minerals and development of nonconventional ocean energy resources; fisheries; marine mammals; the special problems of polar regions; the need for marine-protected areas; and the state of marine scientific research.

We are fortunate that little of the damage that has been done to the marine environment appears to be irrevocable, although some of our nearshore areas are not in good health. There is still time to take the steps necessary to remedy the problems of the past and to create safeguards for the future.

Each nation has a responsibility to protect the oceans from abuse and overuse, and a corresponding interest and right to see that other nations do the same. Because many states lack the financial and technological capabilities to meet this responsibility, aid programs will need to be strengthened, as well as increased efforts to conduct ocean management research and policymaking at the regional level, as is being done through the Regional Seas Program.

In conclusion, Mr. Chairman, I would like to note that the United States played a leading role in convening the Stockholm Conference, and its leadership in formulating necessary responses for marine-related concerns during the past 10 years serves as a noteworthy example and benchmark for others. The environmental organizations sincerely hope that U.S. Government participation in UNEP activities, such as those that are planned for Nairobi and elsewhere this spring, will continue to reflect its record of leadership.

Thank you.

[Mr. Curtis' prepared statement follows:]

Statement of Clifton E. Curtis on Behalf of Center for Environmental Education; Defenders of Wildlife; Environmental Defense Fund; Fund for Animals; Greenpeace, U.S.A.; Humane Society of the United States; Monitor International; National Audubon Society; National Parks & Conservation Association; Natural Resources Defense Council; Oceanic Society; Sierra Club; and World Wildlife Fund, U.S.

I am Clifton E. Curtis, an attorney with the Center for Law and Social Policy, a public-interest law firm in Washington, D.C.*/ I appreciate the opportunity to appear before you today to discuss the status of our ocean environment in the context of your Subcommittee's tenth anniversary review of the Stockholm Conference on the Human Environment. I am presenting my testimony on behalf of thirteen national environmental and conservation organizations -- Center for Environmental Education, Defenders of Wildlife, Environmental Defense Fund, Friends of the Earth, Fund for Animals, Greenpeace, U.S.A., National Audubon Society, National Parks and Conservation Association, Natural Resources Defense Council, Oceanic Society, Sierra Club, and World Wildlife Fund, U.S. -- (hereinafter referred to as "the environmental organizations").**/

These organizations have long taken an active interest in protection of the marine environment. Their efforts contributed to the decision to convene the Stockholm Conference in 1972, and many of the global, regional and national initiatives that have been undertaken in the intervening ten years reflect their continuing efforts to preserve and protect our vital living and non-living ocean resources.

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*/ Mark Hersh, a Stanford law student intern in the Center's clinical program, helped prepare this testimony.

**/ Attached as Appendix A is a description of these organizations.

The environmental organizations welcome this Subcommittee's decision to review the status and health of our global environment on the tenth anniversary of the Stockholm Conference. These hearings provide an opportunity to offer current information and guidance to U.S. decisionmakers and the international community as we chart the course of our individual and collective actions for the future.

I. The Stockholm Conference

Ten years ago, the United Nations Conference on the Human Environment convened in Stockholm, Sweden, as the first global forum for the expression of the world's mounting environmental concerns. It was attended by people from all over the world, including representatives from 113 nations. What they had in common was an increasing awareness of the importance of a healthy environment to the quality of human life, and deep concern about reports of serious degradation of the global environment that was occurring as a result of human activity. The key products of that historic meeting were a Declaration of the Human Environment, which was a statement of common principles and standards of behavior, and an Action Plan, the basic intent of which was to provide a blueprint for our "common efforts for the preservation and improvement of the human environment."

Of particular concern at Stockholm was the health of one of the earth's great common resources, the oceans. While the oceans for years had been viewed and treated as a bottomless disposal for the world's waste -- so enormous as to be impervious to harm -- reports of the polluting dangers of oil and toxic chemicals suddenly triggered images of their impending doom. Major polluting incidents such as the breakup of the Torrey Canyon, which dumped 880,000 barrels of crude oil into the English Channel, helped draw public attention to the problem of marine pollution. But, while people could see the dramatic immediate effects of pollution -- oil-drenched birds and blackened shorelines -- scientific knowledge of the long-term effects of pollution was minimal. The alarm about marine pollution was accompanied by the growing realization that the oceans' living resources were not endlessly bountiful, as was once believed. Over-exploitation of fisheries and marine mammal stocks was a growing concern, but, again, the extent of the threat was unknown due to a dearth of scientific information.

One of the goals of the Stockholm Conference was to protect the marine environment and its living resources against pollution and over-exploitation. Three developments were deemed essential to the achievement of that goal. First, there was a call for strengthened international research programs. It was agreed that efforts to deal with pollution and over-exploitation would be futile without improved understanding of these problems, and international cooperation was considered essential to that effort. Second, a framework was needed to ensure legal and management responsibility for control of marine pollution. National and international legislation was urged to establish this framework. Finally, there was an obvious need to develop sound conservation policies.

II. The State of the Oceans Since Stockholm

The worst case fears about the oceans expressed at Stockholm have fortunately not materialized. This is partly because many of the dire predictions made at that time were based on inadequate knowledge of the oceans, and partly because some of the environmental trends that were signaling disaster ten years ago have been held in check. Nevertheless, virtually all of the concerns expressed at Stockholm still loom very large, and a host of new threats to the health of the oceans has been identified.

There is now general agreement that the oceans are more resilient than was once believed, but little agreement on the extent of that resiliency. There is no evidence of any irreversible pollution effects in the open ocean, but some scientists believe there may be effects that have gone undetected. It is clear that pollution has damaged some of the world's coastal areas, where marine life is most plentiful, but there is no agreement on just how severe the damage is. Consensus is also lacking as to the relative seriousness of pollution from various sources. Although it was virtually ignored at Stockholm, pollution from land-based sources is now recognised by most scientists as the most prevalent and most serious kind of marine pollution. However, national decisionmakers do not appear to have accepted this view, and the problem has yet to be addressed seriously.

The concern at Stockholm over the over-exploitation of living resources has proven to be justified; about the time that the conference was taking place, the world fish catch began to decline -- for the first time in recent history. While it has since leveled off, the outlook is for limited growth. The key to sound fishery management in the future seems to be employment of an ecosystem approach, a concept which stresses the interdependence of the various forms of living and non-living resources.

In addition to pollution and over-exploitation, several new threats to marine life have emerged. One is the physical modification of coastal habitats by industrial development. This is an especially serious problem because of the critical role that wetlands and estuaries play in the life cycles of many species of fish. Another series of environmental issues has been raised because of a surge in interest in the exploitation of oil and gas and other mineral resources found in the seabed. The problems of non-living resource exploitation are compounded when the resources are found in fragile polar regions.

Some technological advances have of course taken place over the last decade. Among the most significant is remote sensing from satellites to explore the ocean, including sub seabed resources. However, our present technological capabilities (including our investment in the use of existing technologies) are still inadequate to develop a real understanding of ocean dynamics. Moreover, pure and applied research and study is needed with respect to a number of important issues, including the effects of various pollutants on the marine environment (and on particular species), the incidence of land-based pollution, and the assessment of fishery stocks.

Perhaps the most significant development of the last decade with respect to the health of the oceans has been the concentrated effort to adopt agreements, treaties, and laws designed to protect and preserve the marine environment. These initiatives have made an enormous contribution in shaping and focusing policies and concerns. The most important of these has been the effort to establish a universally acceptable Law of the Sea (LOS) Convention that would create a comprehensive legal regime for the world's oceans. That Convention is currently in the final stages of negotiation, and it is the sincere hope of the environmental organizations that the United States will sign and ratify the Convention. Other international treaties have been more limited in their scope, dealing with such matters as the dumping of wastes at sea, tanker safety, and pollution from land-based sources. Some of the best examples of international cooperation have come at the regional level, sparked by the Regional Seas Programmes of the United Nations Environmental Programmes (UNEP).

The single most important specific legal development in the last ten years has been the implementation of the 200-mile exclusive economic zone (EEZ) concept. Within its EEZ, a coastal state has sovereign rights, subject to certain conservation standards, to explore, exploit, conserve and manage natural resources, as well as jurisdiction to regulate marine research and protect and preserve the marine environment. The EEZ concept, a radical departure from the more traditional territorial sea concept, was introduced as an international principle at the LOS negotiations in 1973. By 1979, there were 47 nations making claims to EEZs. Whatever the fate of the LOS Convention, the EEZ concept has already been generally accepted as customary international law. This fact has significant implications for future attempts to address a wide range of marine environmental issues, most notable fishery and mineral resource exploitation, pollution control, conservation measures, and marine scientific research.

Now, ten years after Stockholm, some of the legal framework which the Stockholm conferees believed would be essential to the protection of the marine environment is already in place, or close to completion. This fact indicates that the spirit of cooperation urged at Stockholm has not been ignored. Moreover, the efforts suggest that the basic principle of regulating activities which are harmful to the marine environment has been accepted in our society.

There have been, however, serious problems with the development of laws for our oceans. For one thing, the enactment of national marine environmental legislation has been particularly slow, largely because of a low degree of political commitment by some nations, stemming from a lack of financial and technical capabilities. Secondly, some serious problems still remain largely unregulated, most notably land-based pollution.

As we all know, the adoption of laws and framework agreements is often the easiest task. The real work only then begins. The enforcement of laws which safeguard the marine environment leaves much room for improvement. In part, because of the differences in national commitment and capability, and in part because of tremendous difficulties and costs inherent in enforcement, the lack of effective enforcement of environmental laws continues to be one of the most serious barriers to preserving and restoring environmental quality in the oceans.

III. Significant International Initiatives Since Stockholm

A. The U.N. Conference on the Law of the Sea

In December, 1973, the first organizational session of the Third United Nations Conference on the Law of the Sea (UNCLOS) was held in New York, attended by representatives of nearly 150 nations. It was a signal step in the effort to establish an international comprehensive framework for human activity in the marine environment, building on the earlier international LOS efforts in 1958 and 1960. The perceived need for such a framework was largely a consequence of technological advances and expanding coastal state jurisdiction permitting more intensified and parochially regulated use of the world's oceans.

UNCLOS represents the most important international negotiations affecting the oceans that have ever taken place. The emergence of a Convention designed to regulate activities covering over two-thirds of the earth's surface represents a critical step in the evolution of international negotiations. By establishing a framework of agreed rights and duties, and methods for resolving disputes, it can make a significant contribution to the preservation of world peace.

Although the current draft Convention is not perfect, the environmental organizations believe that the benefits from a LOS Convention far outweigh the disadvantages. There are valid criticisms of some portions of the deep seabed mining regime as envisioned under the official draft Convention that are presently the subject of intensive negotiations at the current UNCLOS session. Fortunately, many of the conference participants seem receptive to considering changes to the deep seabed mining provisions of the draft Convention that would provide additional guarantees and improvements. Moreover, the U.S. and other developed countries interested in mining will have subsequent opportunities to make further improvements -- after signing and prior to ratification -- through participation in the development of the necessary regulations.

While the environmental provisions are not all that the environmental organizations hoped for, we can say without reservation that the widespread acceptance and implementation of the Convention's environmental provisions are fundamental to the preservation of the marine environment. The Convention sets the groundwork for a comprehensive system of protection. In total, the environmental provisions constitute a significant advance over what customary international law now provides, and the international consensus reflected in the treaty will help lead to sound strategies and solutions in the future. It is certainly a large step forward for virtually all nations of the world to have agreed on basic obligations and duties to protect what are essentially common resources.

The draft Convention contains no less than 320 articles and eight annexes. Many of these articles are of major importance for the future protection and conservation of the marine environment. These articles set standards and obligations for preventing, reducing and controlling pollution from all sources, as well as obligations to protect and conserve marine living resources. The Convention enhances the present system of flag state enforcement by providing rights of enforcement for port and coastal states. These and other measures involve a blend of coastal state and international cooperative action.

The UNCLOS process has been a long and arduous one that has occupied substantial time of many skilled diplomats. When the proposed Convention is viewed as a whole, the environmental organizations believe strongly that it merits the support of the United States as well as the other 156 member nations involved.

B. UNEP's Regional Seas Programmes

It was recognized at Stockholm that international cooperation would be needed to surmount the world's environmental problems, but that something would have to stimulate that cooperation. Thus, UNEP was created as a mechanism to promote environmental initiatives, a self-proclaimed "environmental conscience of the world." It chose the oceans as one of its primary areas of focus. Its chosen approach to the oceans' environmental problems was a regional one, primarily because the nature of environmental problems varies from region to region, as do cultural, socioeconomic, and political factors. In addition, a regional approach allowed each national government greater participation and control than it would have on a global level. In short, the regional approach had both practical and political appeal.

UNEP's basic role in its regional seas programmes is to help provide "the three major components of environmental activities: assessment, management, and supporting measures." It acts as a catalyst, taking full advantage of existing national and international structures. It brings governments together, and provides some initial money for developing an "action plan." The "action plan" consists of a legal framework, a list of activities to assess and evaluate, and a plan for management activities (e.g., rational exploitation of resources, development of tourism). The governments then take over, and UNEP continues on in a supporting role, helping coordinate such matters as adoption of issue-specific protocols, cooperative monitoring and research, and bringing in other international agencies to give advice.

So far, regional action plans in ten areas of the world have either been completed or are being developed. Numerous treaties and agreements have been created as a result of UNEP's efforts. Still, it is a little early to evaluate the programmes from an operational standpoint. Even in the Mediterranean, which was the first and is the most advanced of the regional seas programmes, the verdict is not yet out. While steps were taken early there to remedy the Mediterranean's very serious marine pollution problem, the most important step, a protocol for the prevention of land-based pollution, was only recently signed. The key to the ultimate success or failure of the programme will be in the implementation of such protocols.

There are, however, many reasons to be encouraged by the progress of the regional seas programmes. In fact, many people are already hailing it as one of the major ocean-related successes of the decade. While long-term results are not yet visible, measures taken under the programmes have, at the very least, prevented things from getting worse. The Mediterranean, for example, was thought to be heading for disaster just a short time ago. Today, it continues to attract more than 100 million tourists per year, as well as bringing in over a billion dollars worth of fish. While not yet saved, it has at least been kept alive.

Other reasons for encouragement have to do with the spirit in which the regional seas programmes have been developed. There has been agreement on a number of important principles, not the least of which are the value of collective action and the need for comprehensive planning. Moreover, there are signs of real commitment to those principles, i.e., a willingness to accept financial responsibility to protect and improve the marine environment. The Mediterranean countries, for example, have pledged $13 billion to implement their protocol on land-based pollution. This agreement and willingness to cooperate is especially encouraging when one considers that it is being displayed by countries normally hostile to each other (e.g., Greece and Turkey, Israel and Syria). This underscores what is perhaps the most important contribution of the regional seas programme; it may be a landmark in the creation of regional communities and thus have significant impact on the future of all international law.

C. Other International Initiatives

In addition to the LOS Conference and the various regional conventions created pursuant to UNEP's Regional Seas Programme, the past decade saw a wide variety of issue-focused international initiatives designed to preserve and improve the health of the oceans. Many of these were in form of bilateral or contingency agreements, but there were also some agreements involving many nations.

Among the most important of the multilateral agreements was the Convention for the Prevention of Pollution from Ships, 1973 (MARPOL), and its protocols agreed to in 1978; the Convention for the Prevention of Pollution from Land-Based Sources, 1974 (the Paris Convention); and the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matters, 1972 (the London Dumping Convention). However, even these major international efforts have had only limited success in preventing marine pollution. This is part due to weak provisions representing the lowest common denominator of agreement, the failure of numerous coastal nations to join the conventions, and enforcement problems.

Many of the international agreements on marine environmental protection were concluded concurrently and symbiotically with the LOS negotiations. In fact, some of them, such as the London Dumping Convention, contain provisions which are expressly reliant on completion of the LOS Convention. While these agreements are certainly not insignificant, from an environmental standpoint no satisfactory alternative to the LOS Convention exists. Only it can provide the international legal order and dispute settlement machinery within which to develop the environmental laws that are crucial to the protection of the world's oceans.

One final international agreement deserves special mention in the context of this ten-year review. Since Stockholm there has been a promising move towards viewing environmental problems in the context of the need to develop a productive and sustainable environment for basic human needs in an interdependent world. In

May 1980 the *World Conservation Strategy* was launched by the International Union for Conservation of Nature and Natural Areas (IUCN) with the support of UNEP and the World Wildlife Fund.

The aim of the *Strategy*, which has been supported by many governments, "is to help advance the achievement of sustainable development through the conservation of our living resources." It provides both an intellectual framework and practical guidance for needed conservation actions, including specific measures that address the problems of the oceans. As with the other initiatives mentioned in this subsection, the *Strategy* is issue-focused. Its message is conservation, and its success lies in its effective implementation by all United Nations and other intergovernmental agencies, bilateral and multilateral aid agencies, national, provincial and local governments, and national and international non-governmental organizations.

IV. *Areas of Concern*

A. *Pollution from Land-Based Sources*

Although it has not received as much attention as other types of marine pollution, pollution from land-based sources is by far the most serious threat to the environmental health of the oceans. While the threat is most immediate in enclosed or semi-enclosed seas, even in the oceans some toxic pollutants are approaching levels that warrant serious global concern. Unfortunately, we know very little about the incidence or impact of land-based pollution. Because it is produced incrementally -- a regular by-product of day-to-day activities -- it is very difficult to collect data on the entry and fate of contaminants. It is also difficult to determine the harmfulness of any one substance, since numerous toxic substances are often present simultaneously. Source identification presents its own special difficulties as well. This difficulty is compounded if one were to include consideration of the significant adverse marine impacts caused by atmospheric pollution, though this pollutant source generally has been dealt with separately.

We do know something about the causes of land-based pollution. Some of it is natural, the product of erosion and the leaching of natural mineral deposits. However, the most hazardous is a product of human activity -- flowing from industrialization and materials utilization. (The one exception is the use of pesticides, which is a very serious marine pollution problem occurring heavily in non-industrialized nations). Radioactive wastes, heavy metals, and chlorinated hydrocarbons, all materials associated with advanced technology, are thought to be the most dangerous pollutants.

In light of the seriousness of the land-based marine pollution problem, surprisingly little has been done about it at the international level. At Stockholm it was seen primarily as a domestic problem, a matter of national sovereignty. The few attempts to address the problem at the international level, such as the Paris Convention, have produced some general principles and commitments but few concrete results.

Programs at the national level have been more effective in actually reducing pollution from land-based sources. Still, they too have their problems. The United States, for example, throws the most money at the problem but its program is not as effective as it might be. Among other problems, it is too treatment oriented, with not enough emphasis on planning. The most successful program is probably that of West Germany. There, charges are levied according to the pollutant content of wastes, which gives polluters incentives to modify their process or improve their waste treatment. The program also benefits from decentralization and professional administration.

There are a number of barriers to the solution of the land-based pollution problem. First, there are informational barriers. Because of the lack of adequate data on the problem, there is some disagreement as to its seriousness. It is often difficult to motivate decision-makers to act unless they are convinced of the urgency of the problem. A second and related barrier is simply the overwhelming nature of the land-based pollution problem. Because the lack of information about pollutants makes it hard to establish pollution standards and other regulations, and because the difficulty in pinpointing the sources of pollution severely impedes enforcement, the control of marine pollution from land-based sources is a very formidible task. Thus, it is that much easier to ignore it until faced with an immediate threat.

Another barrier to the solution of the land-based pollution problem is the familiar one of conflicting national interests; there is little agreement on accountability. Lesser developed nations tend to be less willing and are certainly less able to assume financial responsibility for controlling land-based pollution than industrialized nations. A further difficulty is the lack of international control over private foreign investment, particularly multi-national corporations. Big industry is a major source of land-based marine pollution, and right now it is able to shift its infrastructure to avoid environmental regulation. In addition, industry can sometimes stand in the way of data-gathering with claims of privileged information.

Largely because of political factors, it appears the main thrust of the efforts to control land-based pollution will have to come from national programs. The ones that already exist have shown some potential, and we can learn from them. It is possible that with the continued advent of the EEZ, coastal states will recognize greater incentives to protect their coastlines through such measures as coastal zone management. Also, as our information increases, national decisionmakers may become more motivated to take action. Furthermore, it may be that the land-based pollution problem will be somewhat mitigated by global raw materials scarcities; there will be greater incentives not to waste, which means less pollution.

However, the international community should not rely solely on national initiatives; there are roles that it can play. Globally, the most important contribution that can be made is the building up of a data base -- a centralized information center for research and monitoring. (The monitoring function is currently being performed by UNEP's Global Environmental System -- GEMS.) This will help actuate decision-makers and facilitate the establishment of regulations and standards. Regionally, nations should seek agreements to control land-based pollution, and put pressures on their neighbors and multinationals to assume responsibility for the problem.

B. Pollution from Vessels

One of the central concerns at the Stockholm Conference was the prevention of marine pollution from ships, particularly discharges of oil. It is clear that this has not been achieved -- vessel source pollution is still with us -- but our information is not adequate to identify any real trends in the incidence of this kind of marine pollution. We also know very little about its effects, other than the fact that very large spills can have an immediate, disastrous impact on the surrounding marine and coastal environment. Fortunately, the volume of oil spilled due to accidents appears to have diminished in 1980 and 1981 from the increasing trend that existed during the 1970's -- a trend that was capped in the last two years of that decade by the Amoco Cadiz breakup in March of 1978 and the collision of two supertankers (the Aegean Captain and the Atlantic Empress) in the Caribbean in July, 1979. However, this tells us little about the overall incidence of vessel-source pollution, since most vessel-source pollution (perhaps as much as 85%) is operational, in large part due to tank ballast cleaning discharges. Moreover, the number of spill incidents has continued to increase.

International efforts over the past decade have estabished the foundation for a viable legal regime to deal with the problem of vessel-source pollution. A framework of rules, standards, and procedures now exists, focusing on three areas: preventing the pollution, remedying the damage caused by the pollution, and establishing a jurisdictional framework for controlling and assuming responsibility for the pollution.

More stringent regulations designed to prevent pollution have been made possible by technological advances. Future operational discharges may be reduced by various devices for the retention-on-board and control of effluent discharges, one of the most important being the use of segregated ballast. Many of these devices are required by MARPOL and its protocols. The new technology has also enabled MARPOL to set effluent discharge limits, and create "special areas" where virtually no discharges are allowed. The problem of accidental discharges, the main causes of which are technological deficiencies, uncoordinated ship traffic, and incompetent crews, has also been addressed, most notably through MARPOL and the International Convention for the Safety of Life at Sea, 1974 (SOLAS), in order to deal with such matters as inert gas systems to minimize risk of explosions, radio and navigational equipment, machinery and electrical installations, and personnel standards. While these requirements, among others, represent a significant advance from the state of affairs at the time of Stockholm, there remains a need for more stringent measures concerned with vessel design, operational procedures and personnel qualifications. For example, many current provisions apply only to new tankers, few of which are being built these days. Upgrading existing tankers may mean more cost now, but it also means more savings later.

Traditionally, flag states have had the almost exclusive right to inspect, investigate, and prosecute ships for violation of navigation laws, leaving coastal states with diminished powers within their own territorial waters. This has been a major impediment to the enforcement of anti-pollution laws. Some efforts have been made in recent years to change the status quo, but it remains essentially unchanged. However, provisions in the LOS Convention do grant coastal and port states significant enforcement powers, and should improve things considerably if the Convention comes into force.

To deal with the problem of remedying pollution damage, a patchwork web of liability rules sprung up during the past years, both internationally and in some cases, domestically. In general, the laws now in place impose strict liability for discharges (obviating the need to prove negligence), covering the costs of clean-up, and to a lesser extent the damage to victims and the environment. In addition, they are usually supplemented by laws creating liability funds, to reduce the burden on any individual polluter and help ensure compensation. The liability and fund laws are based in part on the principle of cost internalization, recognizing that spills are an inherent cost of commercial navigation. It is sensible to spread those costs among the vessel and cargo owners, who can in turn pass it on to the consumers of the goods being transported.

Unfortunately, though, there are presently deficiencies in the existing liability and compensation with respect to such issues as: standards of fault; limitations on liability; determination of costs to be reimbursed for remedial measures; assessment of damages caused to natural resources; and dispute settlement machinery. In addition, present liability law is inadequate to deal with liability for discharges beyond the limits of national jurisdiction. A uniform and comprehensive international regime, supported by all coastal states, is needed to rectify these concerns.

Improved vessel traffic management is also essential to the reduction of accidental spills. The formulation of international vessel traffic procedures is the most practical approach to the problem, since the unilateral regulation of traffic is often viewed as unwarranted interference with the free movement of ships. While the SOLAS Convention contains provisions on this issue, greater attention needs to be given to congested traffic routes and semi-enclosed areas. International guidelines for good ship management practices, including shipboard contingency plans, could also help reduce the number of accidental spills and incidents requiring a rescue salvage response. In order to formulate both the traffic procedures and the management guidelines, it is important that various kinds of information be kept in an organized manner and that they be accessible. The best way to achieve this would be through the creation of a central data bank that would be the repository for information on the characteristics and operations of vessels, including traffic route data.

C. Ocean Dumping

Ocean dumping is the transport of land-generated wastes by vessels or aircraft and their disposal in the marine environment. In the late 1960s and early '70s there was a growing awareness that ocean dumping could have serious adverse impact on the marine environment. Because such dumping is an activity largely peculiar to areas beyond national jurisdiction, this issue was one of the most important marine-related problems occupying the attention of the Stockholm participants. Of the numerous recommendations emanating from the Stockholm Action Plan, special reference was made to the need for "an overall instrument for the control of ocean dumping as well as needed regional agreements within the framework of this instrument."

Following Stockholm, and in that same year, both the global London Dumping Convention (LDC) and the regional (North Sea and North-East Atlantic) Oslo Convention were agreed upon in an effort to address the prevention of marine pollution by dumping of wastes and other matters. Since that time, regional conventions concerned with dumping and other marine pollution issues have been established for the Baltic Sea (Helsinki Convention, 1974), and the Mediterranean Sea (Barcelona Convention, 1976), with less specific "framework" provisions adopted as part of several other Regional Seas Programme "Action Plans."

The essence of the dumping conventions are the articles that define dumping, make contracting parties responsible to regulate dumping, and establish the standards applied when dumping wastes. In several of those conventions, annexes list a number of "black list" substances that are prohibited from being dumped, as well as "grey list" substances requiring special permits. Since these conventions have come into force, time and attention has been devoted to what wastes should be "black listed" or "grey listed," how to deal with incineration of sea, low-level radioactive waste dumping, monitoring requirements and other scientific studies to assess the impacts.

With the LDC approaching its tenth anniversay later this year, the contracting parties decided last fall that it would be appropriate to step back and assess the relative roles and future directions of the LDC as well as regional conventions relative to ocean dumping. A representative four-person task team was established to prepare a draft document for the Seventh Consultative Meeting of the LDC (February 1983) that would outline the long-term strategies and objectives of the LDC to the year 2000.

While considerable progress has been made in protecting the marine environment from ocean dumping since Stockholm, there is much work ahead. The effectiveness of the conventions will depend upon the determination of the parties to enforce them. Monitoring of past dumping has been almost non-existent. The need for scientifically credible information about the impacts of dumping on the marine environment (including, but not limited to "assimilative capacity" analyses) and on human health must be addressed. Better scientific models must be developed so that the information gathered will have utility in determining the degree of risks to the marine environment, including living resources and food chain pathways to man. Better comparative studies are needed to assess the relative impacts of land-based and sea-based dumping alternatives. These concerns are heightened in relation to low-level radioactive wastes. Given the potentially irreversible environmental consequences of dumping radioactive wastes in the marine environment, the environmental organizations believe that its dumping should be prohibited until the above concerns have been adequately addressed.

Given the interplay with the LDC of several regional conventions that deal with ocean dumping, this issue offers one of the best opportunities for establishing an effective balance of global, regional and national responses to the problem. The LDC can provide the umbrella framework that can vary on a region-specific basis, complemented by coastal state protection measures.

D. Ocean Mineral and Energy Resources

1. Outer Continental Shelf Oil and Gas

Only 2-3 percent of the oil released into the oceans comes from offshore exploration and production. This amount is not thought to have a significant global impact. However, the environmental side effects of offshore drilling is still a serious problem. For one thing, the immediate localized effects of drilling can be devastating: the disruption of fishing, flora and fauna, and human amenities. Secondly, increased outer continental shelf (OCS) exploitation is projected for the future. With the high prices of oil and gas, and continuing unstable political circumstances, nations are looking to cut their imports by exploring and exploiting their own continental shelf resources. With this increased pressure to develop there is a corresponding need to see that environmental concerns are addressed.

OCS development-related pollution comes from five sources: the dumping of muds and cuttings, discharges of drilling fluids, platform accidents, vessel transport, and blowouts. The first two are regular incidents to drilling. The latter three are not, but inevitably occur. Since operations are on a larger scale now than ever before, there is greater potential for disaster. To appreciate this point, one can compare the 1969 blowout off Santa Barbara, which drew global attention, to the 1979-90 Ixtoc I blowout in the Gulf of Mexico, which took nine months to bring under control. The former spilled 77,000 barrels of oil; the latter, a record of 3.1 million barrels.

It is generally agreed that the major pollution incidents, like blowouts, have a severe immediate and middle-term effect on the surrounding marine environment. However, there is no agreement on the long-term effects of blowouts or any other type of discharge. The reason for this disagreement is that, while a lot of information has been accumulated on the subject, it has been acquired piecemeal, and usually not subjected to rigorous peer review. This is an area where there is clearly a need for coordinated research efforts. Two types of studies are needed: fate studies, which are concerned with the dispersion of the oil or gas once it enters the water, and biological studies, which characterize existing biota in the development area. Biological effects studies are particularly important to establish a baseline of comparison before development activity begins, and to look at short-term and especially the long-term effects on organisms and their ecosystems. The goals of the research should be to identify ecologically sensitive areas, optimal disposal sites for mud and cuttings, and tolerable volumes, concentrations, and rates of discharge.

Overall, the entire range of concerns relative to OCS oil and gas operations is a matter that is ripe for the creation of an international convention. As with vessel source pollution, uniform design, operating and personnel standards are needed (with variations for specific areas such as the polar regions), and liability and compensation requirements must be addressed.

2. Deep Seabed Mining

At present, deep seabed mining remains a commercially unproven venture that has aroused heated debate amongst the nascent deepsea mining industry, existing land-based procedures, developed and developing countries and environmental groups in the context of the U.N. Law of the Sea negotiations. Each of those interest groups are competing to have their concerns addressed in a "universally acceptable" Convention. As mentioned earlier, the deliberations now underway at UNCLOS on Part XI of the draft Convention are the remaining barrier to conclusion of work spanning the decade of the '70s.

The potential environmental consequences of deep seabed mining are serious. To date manganese nodules have been the primary focus of attention, but the recent discoveries of polymetallic sulfides are generating considerable interest as well. Adverse impacts from mining will occur in or near the sea floor, in the water column and at the ocean surface, and as a result of processing sites either at land or at sea. As polymetallic nodules are scraped from the ocean floor, sediment will be suspended and bethic fauna disrupted and destroyed, given their extreme sensitivity to perturbations. Nodules raised to the surface will be accompanied by deep ocean water and sediments, and possibly by dormant spores. The dumping of the sediment on the surface will create a "plume" over the ocean that will probably take years to settle downward. The effect of the plume is unknown, it could be detrimental to important elements in the food chain, like phytoplankton or fish. Processing at sea or on land could have harmful environmental consequences because of the disposal of immense amounts of waste with metal tailings and the intentional or unintentional discharge of highly caustic reagents; processing in or near coastal areas could well change the basic character of those areas.

It is essential that mining proceed with great caution. Given what little is known technically of both short- and long-term effects on the marine environment, the regulatory framework for mining should emphasize analysis of possible environmental impacts prior to any activity being permitted, public disclosure of all pertinent information, broad public participation procedures, and substantial monitoring and research requirements for companies, governments, and the Enterprise (the international entity contemplated under an LOS Convention). In this regard, there should be (1) agreement on a cooperative, long-term research program, (2) regulations and adjustments of operations based on new information, and (3) suspension of mining operations in the case of serious threats to the marine environment. Finally, the LOS Convention framework should establish a sound international enforcement mechanism for assuring compliance with rules and regulations on the part of both companies and the Enterprise.

Assuming the succesful conclusion of a LOS Convention, one further concern involves the interim arrangements that are being planned or proposed for the next several years prior to its coming into force. Such arrangements must be structured to be consistent with, and supportive of, the emerging Convention on the Law of the Sea, and should include environmental measures such as the "protected areas" concept to enhance protection of the marine environment.

3. Nonconventional Ocean Energy Resources

The oceans are a reservoir for solar energy, as well as the locus of a number of natural phenomena, such as tides and waves, which can be tapped for their energy. While none of the oceans' nonconventional energy sources can be expected to make major contributions to the world's energy supply in the near future, due largely to problems of technological and economic feasibility, their contributions may ultimately be significant.

Ocean Thermal Energy Conversion (OTEC) is the technique of using the energy which the ocean stores from the sun. Its principal attractions are the fact that collecting and storing processes are both taken care of naturally, and that the storage capabilities allow for continuous plant operation. Its major limitations are a lack of suitable sites, and a current lack of technology to build a plant. Adverse environmental side effects may also be a serious limitation on the use of OTEC, but they have yet to be thoroughly investigated. Possible local effects include entrainment of enormous numbers of organisms, the release of toxic chemicals, working fluids, metallic ions, and large amounts of carbon dioxide. Globally, extensive use of OTEC might reduce average ocean surface temperature and alter ocean flow patterns, which could have a significant impact on global weather and climate. Clearly, research on these environmental impacts should proceed in tandem with research on the technical and economic feasibility of OTEC.

Tidal energy refers to the conversion of tidal motions into electricity. Its worldwide potential also appears small, due to a lack of suitable sites. Though technically feasible, the capital costs of tidal plants is high. Environmentally, the track record of tidal plants is good; the world's first and only major tidal generation power plant, built in LaRance, France, in 1966, seems to have had no significant adverse effects on the environment. However, the damming that is necessary for a plant could lead to flooding, erosion, and changes in local weather patterns. A possible environmentally safer alternative to tidal plants is the harnessing of tidal power with underwater turbines. However, it is only in the early stages of technological development.

Perhaps the most promising of nonconventional ocean energy sources is wave energy, which is created by winds passing across open waters. Its energy potential is uncertain; while probably small in the U.S., it may be very significant in other parts of the world. According to one 1976 estimate, wave power could supply up to one-half the current electricity requirements of the United Kingdom and, conceivably, all of Japan's energy needs. In addition to its estimated potential, wave power is an attractive energy source because it appears to have no severe environmental side effects, only a minute cooling of water. However, wave power technology is not advanced; no large scale conversion systems have been built. More research is needed on its technological and economic feasibility, as well as its possible environmental impact.

E. Marine Living Resources

1. Fisheries

At one time, fish were thought to be an inexhaustible resource. Today, the world is faced with a long list of depleted fish stocks. In the past decade, the world's fish catch has diminished, from a peak of 70 million tonnes in 1970-71, to a leveling off of 60-65 million tonnes in the last few years. Because of population increases, this means that for the first time in recent history, the per capita supply of fish in the world has been declining.

The main cause of this catastrophe is over-exploitation -- fishing to the point where normal cyclical replenishment is impaired -- brought about by advanced fishing techniques and increased world demand. The outlook for the future is for slow growth. New regulation in response to the overfishing will hopefully keep the catch down. In addition, the depleted stocks will not support bigger catches.

A contributing factor in the decline in fishery production has been the degradation of coastal habitats, which threatens to be an even greater problem if existing trends continue. Some of the degradation is caused by pollution, the causes and effects of which have already been discussed. The rest is a result of the physical modification of coastlines; areas are filled in or otherwise altered for purposes of development. (Upstream development, particularly the damming and channeling of water, also falls into this category). The problem is serious because an estimated 60-80 percent of commercially valuable marine fishery species use wetlands, estuaries and other areas near the ocean shorelines for habitat at some point in their life cycles. Tampering with these areas translates to enormous financial losses. One study found that around eight percent of the total value of the fish catch along the Atlantic and Gulf coasts of the U.S. -- $41 million out of $561 million -- was being lost in the mid-1970's as a result of pollution and physical modification of coastlines. The corresponding figure for the U.S. West Coast during that period was an even more shocking 18 percent, or $45 million.

Perhaps the most critical need in relation to fisheries is universal understanding and employment of an ecosystem approach to fishery management which recognizes the interdependence of life forms within an ecosystem. As an illustration, a person employing ecosystem management principles in formulating conservation policies will look at how the exploitation of one species of fish is likely to affect other species and surrounding habitat. Because of the existence of food chains and other forms of interdependence of marine life, a coastal state which attempts to regulate activity in its coastal waters without employing an ecosystem approach may end up doing more harm than good.

The stage is set for a more rational approach to handling the world's fisheries. The development of the EEZ is sure to play a major role, since nearly 99 percent of the current oceanic catch comes from within the 200-mile coastal zone. If coastal states, particularly developing ones, are to take full advantage of their new legal regimes, they must enact measures regulating the exploitation of fisheries (as many have already done) and development in coastal areas, and these measures must be enforced. They must employ, in short, a system of sound fishery management.

Regionally, nations will have to pool their resources to establish fishery management programs. Not only is this the most efficient way to achieve effective regulation and enforcement, it may be the only equitable way, since most fish stocks are contained in more than one EEZ. Otherwise, one coastal state could conceivably deplete the stocks in adjacent areas. Some regional efforts have already been made in this direction, and more should be encouraged. In addressing fisheries matters -- whether at the national, regional, or global levels -- coastal states should be encouraged to support and participate in the Food and Agricultural Organization's (FAO) comprehensive programme for developing and managing fisheries in the EEZs. The success of the FAO programme depends upon the willingness of neighboring and adjacent states to develop common strategies for development and management.

Sound fishery management on a world-wide basis is largely a matter of better information and methodology. Developing countries in particular need better methods for assessing fishery stocks, so they can know where to set limits ("total allowable catches") and allocate fishing rights. What is also needed are better methods for reducing post-harvest losses, since an estimated 35 percent of the annual world fish catch is lost between catch and consumption.

Globally, it would be very helpful to have a set of international ecosystem conservation standards upon which coastal states can base the regulation of their EEZs. These should be generated at the global level, given the migratory patterns of many species. In addition, there is a need for international research efforts to make the technological advances necessary for sound fishery management, such as stock assessment methods and harvesting and processing technology.

2. Whales and Other Marine Mammals

Historically, whales have been hunted to the brink of extinction. Many species were in serious trouble ten years ago, when the Stockholm Conference called for a ten-year moratorium on whaling. While the moratorium was not achieved, it did have the important effect of creating a strong pro-conservation climate. This led to more stringent regulation of whaling, which is slowing the trends towards extinction. On this point, while we are still close to the end of commercial whaling, the environmental organizations believe that an indefinite moratorium is still needed.

Specifically, three types of measures have played important roles. First, several countries have banned whaling in their economic zones. Second, international trade in products from sei, fin and sperm whales are being prohibited under the provisions of a Convention for the Conservation of Migratory Species of Wild Animals, 1973 (CITES). Third, the International Whaling Commission (IWC) established conservation measures, including, in 1979, the prohibition of all commercial whaling from factory ships everywhere except for the taking of minke whales.

In relation to national initiatives, the U.S. Marine Mammal Protection Act of 1972 and Endangered Species Act of 1973 have become models of national statements of environmental ethic which have encouraged other governments to pass similar legilsation. The MMPA has as its objective preventing species from reaching a threatened or endangered state, while the ESA is designed to prevent extinction and foster recovery of threatened or endangered species. Both acts have provided essential protection for marine life.

Under the emerging LOS Convention, negotiations have recognized that marine mammals are unique. Within their 200-mile zones, the draft Convention ensures that coastal states may totally protect marine mammals, or at the very least not take measures that are less restrictive than the conservation standard they have agreed upon. Moreover, the draft exempts marine mammals from the less stringent optimum sustainable yield criteria which apply to other living resources, and requires coastal states to work through the International Whaling Commission (IWC) or its successor organization.

Most of the larger whale species are still at a small fraction of their original levels. Presumably, some of them are increasing in number, because of the recent protection, but there is no proof of this, since reproduction is slow, and data is difficult to collect. Some species, however, are still seriously depleted and may be near extinction. So that these species can be saved, and so that the gains made over the last decade are not lost, conservation policies must continue and improve. Better methods of policing the whaling industry are needed, as is better data on whale population trends and dynamics. A most encouraging sign comes from UNEP and FAO, who are jointly developing a global plan of action for the study and conservation of whales and other marine mammals.

3. Aquaculture

With the increasing costs of fuel, fishing is becoming a more expensive means of producing food from the sea. One answer to the high fuel costs associated with catching fish is aquaculture, the raising and harvesting of fish and shellfish in a controlled environment. For aquaculture to succeed, however, attractive coastal habitats must be preserved. Aquaculture has recently been gaining importance in the world; it is now practiced in more than 60 countries. It is especially important in China and Southeast Asia, and could be very important to the future of the Third World. It has been suggested that with the proper legal climate, and substantial financial and technological investments, the world aquaculture production, currently estimated at five million tonnes, could double in the next ten years. Technological and scientific assistance to developing countries in this area could be an invaluable contribution to meeting the world's food needs.

F. The Polar Regions

The physical and biological environment of the polar regions are unique in many respects. The oceans of both regions can be fierce and forbidding. Antarctica is a vast continent surrounded by a stormy sea and characterized by an irregular demarcation known as the "Antarctic Convergence" which separates the warmer waters to the north from its polar ocean. Unlike Antarctica, which is solid earth under its persistent ice and snow, the Arctic is entirely ocean, only two-fifths of its surface being permanent ice. For the most part, the Arctic is an ocean of drifting ice packs and ice floes, colliding and heaving upon each other.

Until about ten years ago, Antarctica was thought to have very little economic value. Now there is a great deal of interest in its marine living resources and its mineral resources, particularly oil and gas on the continental shelf. Most of Antartica has been subjected to national claims to these resources, the legal significance of which is uncertain. Consequently, in recent years significant steps have been taken towards the creation of legal regimes concerning living and mineral resources.

Though there are relatively few species of marine life in the Southern Ocean surrounding Antarctica, their numbers are quite significant. Krill, small shrimp-like creatures, are particularly numerous; one recently sighted school of krill contained an estimated ten million tons of biomass. Considerable research is needed to understand, protect, and responsibly exploit that ecosystem. Some of it has already begun; FAO is currently helping review the development of technology for krill extraction and utilization. Research and monitoring are also needed to accurately estimate the potential of living resources in the Southern Ocean. Furthermore, much research is needed on the entire Southern Ocean ecosystem. It is known, for instance, that the krill are a main staple in the diet of many whales and other marine mammals. Study is therefore needed to identify the limits to which krill can be exploited.

The establishment of an international legal regime based on the ecosystem concept was the purpose of the Antarctic Marine Living Resource Convention, which was opened for signature in 1980 and will enter into force on April 7th of this year. While the inclusion of an "ecosystem conservation standard" was a landmark achievement, the Convention has some deficiencies. Concerned about their own parochial interests, the participating nations were unwilling to submit to anything but a consensus procedure for decision-making. The implementation of the Convention is now underway, with Scientific Committee and other meetings scheduled for May and June. Hopefully those efforts can provide the necessary mortar to ensure the success of the ecosystem conservation principles.

The cooperation problems experienced with respect to Antarctica's marine living resources may have unfortunate implications for the region's oil and gas. Environmental safety is of particular concern in the Antarctic (as well as the Arctic) polar regions, for several reasons. First, severe weather conditions and the movement of ice make exploratory drilling and transportation hazardous. Research is needed to improve our weather and ice forecasting techniques. Second, the exploitation of hydrocarbons in polar regions is an enormously complex task, requiring much dredging, excavation, and construction, all of which can have adverse environmental impacts. Third, cold slows the spreading, aging and biodegration of oil spills, though to what degree is uncertain; more research is needed on this question. Finally, oil spills can become trapped under ice packs and thus cause serious problems for the many marine organisms that live at the edges of the packs.

While mineral deposits on land in the Antarctic are currently not attractive from an economic standpoint, the energy industry believes that the hydrocarbon potential of the Antarctic continental shelf is ready to be tapped. As a result, the Antarctic treaty parties are meeting later this year to formally begin negotiations leading toward a comprehensive mineral regime for Antarctica. The basic purpose of the regime will be to provide environmental safeguards for resource exploitation and to protect existing territorial claims. An environmental safeguard which warrants particularly serious attention and support is the establishment of protected areas in which no resource exploitation would occur.

In the Arctic polar region, the development of offshore energy resources is the major focus of commercial interest, though Arctic fishery resources include several high unit value species. One critical concern peculiar to the Arctic polar region is the survival of native Eskimo subsistence communities, including those which exist along the northern edge of Alaska. Overexploitation of marine living resources or degradation of the marine environment through oil spills could decimate those communities. While no

Arctic-focused international conventions exist for living resource or mineral exploitation, many of the same concerns that have been raised in relation to Antarctica require cooperative action in the Arctic.

In short, we know that the conditions in polar regions are much different than in any other part of the world, but we know relatively little about the implications of those difference for the exploitation of polar living and mineral resources. As commercial interest in these regions grows during the 1980's, exploitation must be premised on sound information, and technology must be developed that will ensure adoquate protection.

G. Marine Protected Areas

Given the scale of our present ignorance of marine processes, far too little attention has been devoted to the concept of protected areas in which the marine environment would not be interfered with by commercial activities. Our natural deepsea and nearshore marine systems have existed for millions of years before the appearance of humans. Our intervention by exploitation and even by vigorous exploration can cause serious adverse impacts. Historically, just as fish seemed to be inexhaustible, marine habitats were thought to be unalterable or at least capable of quick recovery.

Given the increasing rate of coastal habitat destruction, some nations have taken steps to give special protective status to certain nearshore marine areas, although the numbers of types of ecosystems covered are very limited. It is imperative that we increase those efforts, and that similar steps be taken in selected deep ocean areas. The vast area of the ocean and the difficulties of operating at great depths will not offer incidental protection for long. Heretofore, protection has been achieved by default, because the deep sea was too remote to be affected greatly by human activity. Now such protection must begin to involve conscious action.

The inclusion of "stable reference areas" in the recently enacted U.S. law, the Deep Seabed Hard Minerals Act of 1980, represents a step in the right direction. However, no nation can establish effective deep ocean protected areas unilaterally. Since such protected areas can only be established by international agreement there is a strong prima facie case for the involvement of the international scientific organizations -- particularly the Scientific Committee on Oceanographic Research (SCOR) and the International Oceanographic Commission (IOC) -- at an early stage in formulating selection criteria, recommending suitable areas, and preparing research and monitoring proposals.

The function of protected areas should be broad, covering the need to allow, encourage and facilitate scientific investigation over a prolonged period in undisturbed zones, and to obtain information pertinent to alternative uses and values of the deep sea, and possible conflict of such uses and values with commercial activities, such as deep seabed mining. These other uses and values, which may not now be even imaginable, can include recognition and use of both other economic resources of materials and energy and non-quantifiable scientific or cultural uses and values. In the coming decades it is highly likely that other, totally unforeseen "uses" of the deep sea will be conceived, and this appears increasingly to be the case as technology progresses and more knowledge is obtained. Designation of protected areas on the basis of present very inadequate knowledge would not a priori ensure that all such uses could be accommodated, but it would certainly vastly increase the probability of their eventual accommodation, keep more options open, and provide more responsible protection of the common heritage of mankind.

It is encouraging to note that in October, 1981 the 15th Session of the General Assembly of the International Union for Conservation of Nature and Natural Areas (IUCN) adopted a resolution urging the establishment of protected areas in the deep ocean. As part of the Resolution, which was approved by 360 participants from 57 countries, the Assembly recommended "the establishment of large sanctuaries in areas where mining is contemplated in order to further knowledge of the areas of the ocean beyond national jurisdiction and to protect the common heritage of mankind."

H. Marine Scientific Research

From the discussion thus far, it should be apparent that our knowledge and understanding of the world's oceans is still far from what it must be if we are to successfully protect and improve the marine environment. This point cannot be stressed enough.

Research is needed in virtually every area relating to the health of the oceans, from marine pollution, to fishery management, to polar resource exploitation. It is needed to answer some basic questions, such as the long-term effects of pollution on marine life, as well as to improve technology so that we can better control human activity in the oceans.

However, as much as there is yet to be done, the past decade has witnessed some significant accomplishments. Modern technology has certainly had its influence on ocean-related sciences. For example, low-cost computers are now available for fishery management systems, and low-cost satellite receivers can be used in navigation. A whole host of new technologies facilitates the collection of data on the oceans themselves. Remote sensing from satellites makes possible global synoptic observations of ocean conditions, which help provide information on surface pollutants, currents and temperatures, oil and gas reserves, and biological productivity. Sophisticated ocean buoys help us to better understand three-dimensional movements and the nature of vertical mixing among ocean layers, information which is important for the monitoring of ocean pollution, among other things.

It was a goal of Stockholm to encourage the strengthening of international research programs. This has not been achieved to any satisfactory degree; there is still a strong need for cooperative research at the international level. Many of the problems that warrant study are of a large magnitude, requiring extensive facilities and personnel. Pooling resources is the most sensible answer to the trend toward "bigger technology." In many cases, the resources must come mainly from the more developed countries. This is inevitable; poorer countries cannot hope to make the technological advances necessary to safeguard the marine environment without aid from the wealthier ones. Unfortunately, this aid has thus far been lacking.

Cooperative research is also the best way to achieve scientific consensus on a variety of marine environmental issues. Too much research is conducted piecemeal, with little or no peer review. With little agreement on facts and findings, there can be little agreement on priorities, i.e., which problems deserve the most serious attention. Furthermore, some sort of consensus is needed so we can better predict the consequences of human activity in the marine environment and thus be in a better position to regulate that activity. A prime example is offshore drilling. The more agreement there is concerning the environmental impacts of drilling, the more responsive our regulations can be to those impacts. This is of course in the interests of environmentalists, but it is also in the interests of the developers, since it results in stringent regulations only where they are needed, and helps reduce the financial question marks associated with development activity. The present fragmented state of research suggests a need for an international commission of scientists to coordinate and review research efforts on marine environmental issues.

There has been a fear expressed by some people that the LOS convention will be a restraint on research, since it gives coastal states the right to regulate and in some cases prevent research in their EZZs. In fact, it will probably have just the opposite effect. While historically oceanography has been relatively free from political constraint, over the last decade marine scientists have increasingly faced difficulty conducting their research in foreign waters. A study on U.S. oceanic research in foreign waters from 1972-1976 found that scientists were regularly subjected to arbitrary delays and refusals to allow the research. With no law to govern them, coastal states can do what they please. The LOS convention would establish the basic ground rules for conducting marine scientific research, including the conditions under which consent can be denied, and thus help eliminate the arbitrary and unpredictable way in which research is presently handled.

An essential complement to effective research on marine issues is the need for "foresight capability planning" that can be used by scientists (and other policymakers) in order to systematically project and evaluate future trends for the interrelated problems of pollution, resources and the environment. The most comprehensive recent discussion of the need for foresight capability planning is contained in The Global 2000 Report to the President (issued in July 1980). Since this specific topic will be addressed in detail by others at these hearings, it needs only to be noted here in relation to the importance of approaching marine issues in that larger context.

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V. Conclusion

It is true that the health of the oceans is not as poor as it was projected to be ten years ago -- in part because of international cooperative efforts -- but the situation is still far from what it should and can be. We are fortunate that little of the damage that has been done to the marine environment appears to be irrevocable, although some of our nearshore areas are not in good health. There is still time to take the steps necessary to remedy the problems of the past and to create safeguards for the future.

The message and action initiatives contained in the World Conservation Strategy must be heeded in relation to our oceans, with conservation as the guiding principle in our efforts to advance the achievement of sustainable development for everyone. The successful conclusion of a universally acceptable Law of the Sea Convention would provide a wide range of opportunities to implement this principle and others that can provide sound strategies and solutions.

The only boundaries that our ocean ecosystem knows are man-created political ones, and these cannot prevent the spread of pollution or the movement of fish. Therefore, each nation -- acting on its own and through such international arrangements as the LOS Convention after it comes into force -- has a responsibility to protect the oceans from abuse and overuse, and a corresponding interest and right to see that other nations do the same.

Because many states lack the financial and technological capabilities to meet this responsibility, technical and financial aid programs will need to be strengthened, as well as increased efforts to conduct ocean management research and policymaking at the regional level, as is being done by UNEP's Regional Seas Programme. It is clear that a major cooperative effort will be needed if we are to successfully cope with the problems facing the world's oceans. As past experience has shown, the barriers to success exist, but they are not insurmountable.

The United States played a leading role in convening the Stockholm Conference, and its leadership in formulating necessary responses for marine-related concerns during the past ten years serve as noteworthy examples and benchmarks for others. The environmental organizations sincerely hope that U.S. government participation in the UNEP activities that are planned for Nairobi and elsewhere this spring will continue to reflect its record of leadership.

Although the oceans have been in existence for billions of years, their degradation is a process which began only recently, a by-product of an increasingly crowded and complex world. The responsibility is ours to protect those aeons of natural investment. Other problems may seem more immediate, but few are as pervasive in their implications.

Thank you for this opportunity to testify.

APPENDIX A

The CENTER FOR ENVIRONMENTAL EDUCATION is a Washington-based group with over 440,000 supporters concerned with the biological diversity and ecosystem integrity of the seas. DEFENDERS OF WILDLIFE is an organization with a membership of approximately 70,000 persons and offices at 1244 19th Street, N.W., Washington, D.C. 20036. The ENVIRONMENTAL DEFENSE FUND, whose principal place of business is 475 Park Avenue, New York, NY 10016, has a membership of approximately 45,000 persons and a 700-member Scientists' Advisory Committee, including members residing in 18 foreign countries. FUND FOR ANIMALS, whose principal place of business is 1765 P Street, N.W., Washington, D.C., has a membership of 180,000. GREENPEACE, U.S.A., whose principal office is at 2007 R Street, N.W., Washington, D.C. 20009, is a national organization composed of local membership groups with 280,000 sponsors and donors. The HUMANE SOCIETY OF THE UNITED STATES is a national organization with 155,000 members and its headquarters are at 2100 L Street, N.W., Washington, D.C. 20037. MONITOR INTERNATIONAL is a non-membership organization with its principal office at 19102 Roman Way, Gaithersburg, Maryland 20760. The NATIONAL AUDUBON SOCIETY, whose principal place of business is 950 Third Avenue, New York, NY 10022, has a membership of approximately 460,000 persons, including members in more than 100 foreign countries. The NATIONAL PARKS AND

CONSERVATION ASSOCIATION, whose principal place of business is 1701 18th Street, N.W, Washington, D.C. 20009, has a membership of approximately 40,000 persons. The NATURAL RESOURCES DEFENSE COUNCIL, whose principal office is at 122 East 42nd Street, New York, NY, and which has additional offices in Washington, D.C., and San Francisco, CA, as well as nine regional chapters, has 45,000 members. The OCEANIC SOCIETY, whose principal place of business is Magee Avenue, Stamford, CT 06902, and which has an additional office in San Francisco, CA, has 70,000 members. The SIERRA CLUB, whose principal place of business is at 530 Bush Street, San Francisco, CA, has a membership of approximately 285,000 persons, including persons residing in 62 foreign countries. The WORLD WILDLIFE FUND, U.S., is a non-membership, publicly supported organization with offices at 1601 Connecticut Avenue, N.W., Washington, D.C. 20036.

Mr. Bonker. Mr. Curtis, you stated on page 80 that in the past decade, the world's fish catch had diminished from a peak of 70 million tons in 1970–71, to a leveling off of 65 million tons in the last few years. Dr. White, who appeared on the panel before you, said that the world fishery yields rose during the sixties and seventies. I am trying to reconcile these two statements.

Mr. Curtis. I would have to look at the sources of the material. The information that I drew upon were in part based on some IUCN materials and other domestic documentation. That information reflects that we reached a peak in the late sixties and the early seventies, but in the last few years there had been a leveling off to a total annual catch below the peak of the 70 million figure I used.

Mr. Bonker. Did you include anadromous species?

Mr. Curtis. It was intended to include both anadromous and catadromous species.

Mr. Bonker. There seemed to be a dramatic shift, the yields increased during the sixties and seventies, but, according to your statement, just in the past decade it has greatly diminished. I just wonder what your statistical basis is.

Mr. Curtis. I wasn't intending to portray a dramatic shift, but there was a downward shift to diminished catches. I would be glad to provide some additional information and could speak with Dr. White as well and see if we can resolve whatever inconsistency exists, if there is one.

Mr. Bonker. I don't think there is a great disparity between the two. I am just trying to understand the forces that contributed to what seemed to be an optimal yield in the decade of the sixties and then there is a dramatic diminishing of the resource. Perhaps we can work that out.

You refer to the 200-mile zones which coastal countries have now adopted. You said somewhere in your verbal statement that that was compatible with the text of the Law of the Sea Treaty, nations extending their fishing jurisdictions. It seems to me that at the time when Congress was taking that up, the administration had opposed passage of the 200-mile zone primarily because it was incompatible with the treaty that was being negotiated at the time.

Mr. CURTIS. Prior to the start of the convention in 1973, very few countries had adopted a 200-mile zone. Some of the first countries to adopt a 200-mile limit were those along the South American Coast. I think the United States was opposed even at the early start of the conference. They came around to accepting that principle as the conference developed. Because of the implementation by a number of other coastal nations as well——

Mr. BONKER. The United States opposed it all the way. It was only after Congress acted and more or less forced the issue. I mean all administrations opposed it. But I think the basis of the opposition came from the State Department, and it was the State Department who directed our representatives on the Law of the Sea Conference.

Mr. CURTIS. Through the adoption of the Fisheries Conservation and Management Act, in 1976, the United States formally adopted a 200-mile EEZ.

If I could make one other comment in relation to the Law of the Sea proceedings that are going forward. There has been some press accounts in the last couple of days which have reported that breakthroughs have been made. I think that those reports of breakthroughs are exaggerated and overly optimistic. The breakthroughs, to the extent there have been some, only deal with the preliminary investment pioneer mining measures. But there still are numerous major obstacles before the United States would find the deep seabed mining provisions adequate.

Mr. BONKER. The New York Times noted in an editorial that the administration has agreed to a cartel that would eventually limit the mining of the seabed and its riches and that Third World countries in exchange agreed to give a monopoly on such mining for an extended period for the Western countries engaged in working on that resource.

After going through this ordeal with Ambassador Richardson, who was a superb negotiator on our behalf, I thought we had reached agreement on 95 percent of the text—of course, the remaining 5 percent is always the most difficult. I would like to ask when you really believe that regardless of the administration and commitment, that we will have an agreement between the industrialized countries and Third World countries on a Law of the Sea treaty.

You want to see it but do you think, frankly speaking, especially in view of this administration and the great setback that it has brought to the negotiations, that we will ever——

Mr. CURTIS. The current administration's positions on deep seabed mining have caused a setback to the negotiations. But there has also been some progress. One of the most emotional and controversial issues, for example, was the transfer of technology. It is my understanding that a compromise has been reached on this issue that is largely acceptable to the developing countries, the United States, and other industrialized countries.

As I see what's happening with the current negotiations, there is an effort by what has been affectionately labeled the "Gang of Ten,"—mostly Scandanavian countries plus Canada, New Zealand, and Australia—to serve as mediators between the two poles, between the two extremes with respect to remaining differences. There is reason for hope, given the influence of those nations and their representatives serving as the intermediaries, that acceptable compromises on outstanding issue can be reached.

I do think there will be a Law of the Sea Convention opened for signature and I think at some point, by the mid-1980's at the latest, the United States will be a party.

The United States might wait to sign the convention until after the regulations have been written by the Preperatory Commission, but that is my more pessimistic view. My more hopeful view is that the United States will receive enough of the improvements they want and that they then will go forward and sign the Law of the Sea Convention in order to participate in the development of regulations, expecting further improvements to be made during that phase.

Mr. Bonker. I have other questions but we must move on.

Mr. Scherr.

STATEMENT OF S. JACOB SCHERR, NATURAL RESOURCES DEFENSE COUNCIL

Mr. Scherr. Mr. Chairman, I am S. Jacob Scherr, a senior staff attorney with the National Resources Defense Council. I appreciate very much this opportunity to appear before this subcommittee as part of its review of global environmental issues 10 years after the United Nations Conference on the Human Environment in Stockholm. As requested by the subcommittee, my statement will address the growing problem of hazardous exports.

A decade ago at Stockholm, hazardous exports were really not an issue. There was some suggestion that developing countries might become "pollution havens" for industries fleeing stricter health and environmental standards in the industrialized countries. Also, there was considerable discussion of the continued use of DDT which although banned or severely restricted in many industrialized countries, was viewed by developing nations as essential to combating malaria and controlling agricultural pests.

Much more attention at Stockholm was devoted to the movement of pollutants and water across national borders. An example of this is acid rain and, as I am sure the next witness will tell you, this remains a very serious global environmental issue. However, during the last few years there has been a growing awareness of another form of transfrontier pollution. Here I am referring to the increasing presence in international trade of dangerous substances and products.

It is an issue which has received a lot of attention in the United States. In this regard, I would like to note for the chairman the hearings that were held in 1980 and 1981 on this issue before the House Foreign Affairs Subcommittee on International Economic

Policy and Trade and an excellent series of articles by Bob Wyrick entitled "Hazards for Export" which appeared in Newsday in December of last year.

The hazardous exports issue is a complex one. It covers a wide range of diverse products including pesticides, pharmaceuticals, industrial chemicals, hazardous wastes, consumer goods, and food products. Despite this complexity and diversity, I think there are two central interrelated elements of the hazardous export problem.

The first is what has been called dumping. As a general matter, national laws controlling potentially hazardous substances simply exclude products that are destined for overseas sales. Therefore, substances which are considered too dangerous or too little studied for use in our own country are nonetheless able to be freely shipped abroad, often to unsuspecting foreign customers.

Perhaps the most celebrated of a number of dumping incidents during the last decade involved infant sleepwear treated with the cancer-causing flame retardant TRIS. In April of 1977, the Consumer Product Safety Commission pulled this product off the U.S. market. Within the next 9 months, some 2.4 million of these garments were shipped overseas primarily to Africa, Asia, and Latin America.

The second element of the hazardous export problem is what I refer to is the existence of the double standard in the global marketplace. There is one standard for developed countries and another much lower standard for developing ones.

During the decade since Stockholm, developing countries have enacted legislation, and established government agencies in response to their burgeoning importation and use of pharmaceuticals, pesticides, and other chemicals. However, with little or no effective enforcement of existing controls, many developing countries have truly free markets in these chemicals. This is really a situation primed for abuse.

It appears that multinational chemical companies follow a double standard when it comes to the developing world. For example, even doctors may not be advised of the same information about a drug's hazard, which is readily available to doctors in developed countries. Multinational companies may engage in marketing practices abroad in developing nations which they would never even consider for use at home.

In addition to the lack of control, consumers in developing countries are often very less able to defend themselves. For example, pesticides are widely used by illiterate farmworkers without any protective clothing. As a result, pesticide poisonings have reached epidemic proportions in a number of developing nations.

Mr. **Bonker**. You may refer to the infant formula case where capitalist countries are pedaling their products and affecting other populations.

Mr. **Scherr**. I think the infant formula case is a very interesting one. It has received a lot of attention. It is the case where a product, which is generally not considered to be hazardous in industrialized countries, becomes lethal in a developing world context. There has been a tremendous amount of concern about the way infant formula is marketed in developing nations. As a result, the

World Health Organization adopted last May a code of marketing practices.

I think that the international community has made significant progress during the last decade in international cooperation on hazardous substances. There are a number of international programs which assess product hazards and distribute technical and policy information. However, during the last 5 years, developing countries, along with citizen organizations worldwide, have started to call for the development of some rules to govern international trade in potentially hazardous substances. Infant formula is one example.

At the center of this debate is the question of what is the responsibility of exporting nations, primarily industrialized countries, and their multinational companies as purveyors of hazardous products? It is clear from recent resolutions of the United Nations Environment Program Governing Council and the United Nations General Assembly that the developing countries want to be in a position to make their own informed judgments as to the risks and benefits posed by exported hazardous products.

Mr. **Bonker**. Cannot developing countries issue, just as a matter of policy, regulations for imported products, as the Japanese and others do, just describe certain conditions? Why would you have to set up an international agency to establish standards and so forth. The importing countries can always issue their own standards for products coming into the country.

Mr. **Scherr**. One problem is the establishment of standards. The other much more difficult one is the monitoring of what appears to be a greatly increasing volume of trade in chemicals and hazardous products. I would like to point out that not even the United States can adequately protect itself against hazardous exports. Therefore, it is too much to expect a small developing country to be able to guard against the exportation of a product which has been banned in the country of origin.

There has been movement toward an international system whereby an exporting country does not permit a product against which it has taken action on its own because of known health or environmental hazards, to be exported until there is an opportunity for the importing country to make its own judgment as to whether or not to purchase that product.

Under six different Federal statutes the United States now requires export notices for banned substances. While the United States is the only country with such requirements, it appears that the idea of export notification is gaining wider acceptance. Three weeks ago in Paris, an OECD group of experts from 10 industrialized countries agreed to a report endorsing the concept of export notices for banned chemicals.

Mr. **Bonker**. Was this Government represented at that meeting? It seems to me the whole trend is in the opposite direction. I mean, in this country.

Mr. **Scherr**. I will get to that point in a moment. I was heartened by this particular meeting in which I took part because the group was made up primarily of representatives from governmental agencies and chemical industries in the major chemical exporting countries, including the United Kingdom, France, Switzerland,

and Japan. This group agreed to a report which embraced the concept of export notification for banned chemicals.

Mr. **Bonker**. My question was, was this country represented?

Mr. **Scherr**. Yes; this country was represented by the State Department, and the Commerce Department.

Mr. **Bonker**. They joined in that recommendation?

Mr. **Scherr**. Yes, but they made it clear that the Reagan administration was reconsidering its policy in this area and, therefore, may ask for a deferral of further consideration of the report at a later stage.

Mr. **Bonker**. Do you think that is a likely outcome?

Mr. **Scherr**. I think it is. I feel the United States has asserted leadership in this area during the last 5 years and what we are seeing now is that this leadership is starting to pay off as other countries are recognizing that the idea of export notification for banned chemicals makes sense. I am still hopeful that the Reagan administration will reconsider the position it may be taking in regard to this area.

This question of hazardous exports received considerable attention during the Carter administration. It was the subject of an Executive order issued by President Carter in January 1981. This Executive order would have strengthened existing export notice requirements for banned products and substances. However, 34 days later, President Reagan revoked the order. Since that time, the State and Commerce Departments have undertaken a re-review of U.S. hazardous export policy.

In contrast to the Carter administration, the review undertaken by the Reagan administration has been essentially carried out behind closed doors. Last September, a copy of a draft report of recommendations for the President was leaked to the press. The draft made clear that the Reagan administration wanted to return to a more laissez-faire attitude toward hazardous exports.

The public reaction was quite strong, but my understanding is that the report has not been changed. In fact, the Commerce Department apparently now is going to recommend that the current prohibition in our law against the export of unapproved drugs should be lifted. However, I feel there is little evidence that Congress is going to go along with opening the floodgates to "dumping."

In summary, I would just like to say that in spite of the change of attitude on the part of the Reagan administration, the problem of hazardous exports is not going to go away. Nor is it going to be solved by the "magic of the marketplace." It is my hope that the administration will see the 10th anniversary of the Stockholm Conference as an opportunity to reassert its commitment to cooperate with other countries in tackling this growing problem.

Thank you.

Mr. **Bonker**. Thank you, Mr. Scherr.

[Mr. Scherr's prepared statement follows:]

PREPARED STATEMENT OF S. JACOB SCHERR, SENIOR STAFF ATTORNEY, NATURAL RESOURCES, DEFENSE COUNCIL

I am S. Jacob Scherr, a senior staff attorney with the Natural Resources Defense Council. I appreciate very much this opportunity to appear before this Subcommittee as part of its review of global enviromental issues ten years after the United Nations Conference on the Human Environment in Stockholm. As requested by the Subcommittee, my statement will address the growing problem of hazardous exports.

The Natural Resources Defense Council is a non-profit, public interest environmental organization with some 35,000 members in the United States and some 20 foreign nations. Over the last five years, NRDC has been actively concerned about the export of dangerous substances and products, particularly to developing countries. We have been involved in legal and administrative proceedings and have testified before the Congress on several occasions in regard to the need for effective U.S. controls over exports of banned or severly restricted substances. I was a member of the U.S. delegation to the 1978 meeting of the Governing Council of the United Nations Environment Programme (UNEP), at which the issue of hazardous exports was addressed. I have served as a member of an Organization for Economic Cooperation Development (OECD) expert group on "information exchange related to the export of hazardous chemicals." I am a contributor to a soon-to-be-published book on this issue, entitled Pills, Pesticides, and Profits: The International Trade in Toxic Substances (North River Press).

OVERVIEW OF THE PROBLEM

A decade ago at the Stockholm Conference, hazardous exports were not really an issue. There was some concern that developing countries might become "pollution havens" for industries fleeing more restrictive health and environmental requirements in developed countries. Also there was considerable discussion of the continued use of DDT, which, although banned or severely restricted in industrialized nations, was viewed as essential by many developing countries for the control of malarial mosquitos and agricultural pests.

Much more attention was focussed upon transfrontier pollution where activities in one country results in pollution affecting the environment of another. It was agreed in Principle 21 of the Stockholm Declaration on the Human Environment that nations have "the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other [nations] or of areas beyond the limits of national jurisdiction."

The movement of pollutants by wind or water across national frontiers, such as SO_2 in the form of acid rain, remains a major global environmental issue. However, there has been growing awareness in recent years of another form of transfrontier pollution. Here I am speaking of the increasing pesence in international trade of dangerous substances and products.

The hazardous export issue is a complex one, which covers a wide range of diverse substances and products, including pesticides, pharmaceuticals, industrial chemicals, hazardous wastes, consumer goods, and food products. Nonetheless, there are two central, interrelated elements to the problem of hazardous exports.

The first is what has been called "dumping." As a general matter, national laws controlling potentially dangerous products simply exclude those goods which are destined for sale overseas. As a result, substances considered too dangerous or too little studied for use at home may be freely shipped abroad to often unsuspecting foreign customers. The prevailing norm in international commerce remains "Caveat Emptor" or "Let the Buyer Beware."

Perhaps the most celebrated of a number of documented incidents of "dumping" during the last decade involved infant sleepwear treated with the flame retardant TRIS. In April 1977, the U.S. Consumer Product Safety Commission banned the domestic sale of TRIS-treated baby pajamas upon evidence that TRIS could cause cancer by absorption through the skin. Within the next nine months, an estimated 2.4 million of the banned garments were exported mostly to Latin America, Africa, and Asia.

The nation of Kenya has been a leader in calling for a halt to the uncontrolled export of banned products. In May 1977, at a meeting of the UNEP Governing Council Dr. J.C. Kiano, then a Kenyan government official, charged that developing countries would no longer tolerate seeing their nations used as "dumping grounds" and their people used as "guinea pigs" for drugs and other chemical products judged unsuitable for sale in the exporting nations.

Yet the developing countries are not the only victims of such practices. There were reports that banned TRIS-treated pajamas were being sold in the flea markets of Paris. Last year, it was revealed that eels from Lake Ontario, which were prohibited from sale here, were being shipped to West Germany, the Netherlands, and Italy. In 1979, the U.S. General Accounting Office reported that the Food and Drug Administration's efforts to inspect imported agricultural products were inadequate to assure that they did not contain unduly high residues of pesticides, including some whose use had been banned in the United States.

The second element of the hazardous export problem is what I refer to as the existence of a "double standard" in the global marketplace. There is one standard for developed nations and a much lower one for developing countries.

The 1970s saw an exponential growth in international commerce in chemical products. From 1970-1978, worldwide trade in chemicals increased from $22 billion to $96 billion, while chemical exports from industrialized to developing nations grew from $5 billion to $24 billion. In regard to pesticides, Third World imports rose in just five years (1974-1978) from $641 million to almost $1 billion. During the last ten years, developing countries have increased their spending on pharmaceuticals at a dramatic rate of some 20% a year. Most of these drugs come from multinational pharmaceutical companies based in the developed nations.

During the decade since Stockholm, many developing countries have enacted legislation and established governmental agencies in response to the burgeoning use of drugs, pesticides, and other chemicals. However, environmental and health officials in many developing countries are often in weak governmental positions, without access to adequate technical information and expertise, and sometimes compromised by corruption. With little or no enforcement of existing controls, many developing countries have truly "free markets."

It is a situation primed for abuse. As documented by researchers in the United States and the United Kingdom, multinational drug companies appear to be following a double standard when it comes to the developing world. Companies do not properly label products as to their usage. Even doctors may not be provided the same information about a drug's hazards as is provided in developed countries. Also, in order to boost sales, multinational companies may engage in marketing practices abroad which they would never even consider at home.

In addition to the lack of controls, consumers in developing counties may be even less able to defend themselves. Pesticides are widely used by illiterate farmworkers without any protective clothing. As a result, pesticide poisonings are reaching epidemic proportions in a number of developing countries. It has been recently estimated that some 22,500 persons die from pesticide intoxication each year.

The problem of infant formula in the Third World has received a tremendous amount of attention. It is an example of where a product, generally not considered to be hazardous in industrialized countries, becomes lethal in a developing world context. In sum, modern technologies have spread worldwide much more quickly than the capability to assure their safe use.

The implications of growing chemical abuse in developing countries are global in scope. As one example, last summer 150 physicians from 25 developed and developing countries issued a joint appeal to curb the indiscriminant overuse of antibiotics, which often are freely available without prescription in developing countries. Unless steps are taken, we will be faced with a worldwide public health problem as more and more infectious disease organisms become resistant to antibiotics.

Another example is DDT. The use of DDT to control malaria is oft-cited as evidence of the need of developing countries for chemicals banned in developed nations. Yet the excessive use of DDT for agricultural purposes has produced DDT-resistant mosquitos and a resurgence of malaria in Central America and India.

RESPONSE OF THE INTERNATIONAL COMMUNITY

International cooperation regarding hazardous substances has increased during the last decade. As a result of the Stockholm Conference, UNEP established the International Registry of Potentially Toxic Chemicals (IRPTC). The IRPTC has gathered information about some 40,000 chemicals and has prepared detailed profiles on some 330 chemicals. It publishes a quarterly bulletin, which contains data on newly-discovered chemical dangers, and runs an inquiry service. In 1977, the International Labor Organization set up the International Occupational Safety and Health Hazard Alert System, which provides for rapid dissemination of such information to a worldwide network. The OECD has instituted procedures for exchange of information among its membership of 24 industrialized Western countries on national actions to ban or regulate consumer products and toxic chemicals. Both the World Health Organization and the Food and Agricultural Organization are engaged in the assessment of chemical hazards and the distribution of technical and policy information.

While very important, these and other multilateral efforts have not diminished "dumping" and double standards as hallmarks of the global marketplace. These international activities are voluntary in nature; and many nations have given them at best their half-hearted support. Too often national desires to promote exports and foreign investment overwhelm concerns about the protection of public health and the environment.

During the last five years, developing countries have been joined by citizen orgnizations worldwide in calling for new international rules to govern hazardous exports. At the center of the growing debate is the issue of the responsibility of exporting nations and multinational corporations as sellers of dangerous goods.

In 1977 and 1978, the UNEP Governing Council adopted decisions urging governments to take steps to prevent the export of banned or unapproved products without the knowledge and consent of the appropriate authorities in the importing country. In 1979, the matter of hazardous exports was first addressed by the United Nations General Assembly. The General Assembly passed a resolution which calls upon:

> Member states to exchange information on hazardous chemicals and unsafe pharmaceutical products that have been banned in their territories and to discourage, in consultation with importing countries, the exportation of such products to other countries.

It is clear from these normative statements that developing countries want the opportunity to make their own informed judgements as to the risks and benefits posed by particular hazardous products. With amendments to the federal pesticide and consumer product laws in 1978, there was already a trend in American law towards export notifications for banned substances. While the U.S. is now the only country with such requirements, the idea of export notifications is gaining wider acceptance. Three weeks ago in Paris, a group of experts from 10 industrialized countries, meeting under the auspices of the OECD, agreed to a report endorsing the concept of export notices for banned chemicals. The group, consisting primairly of representatives from governmental agencies and chemical industries, proposed a two-step export notification scheme as guidance for the OECD member counties, which account for much of the world's trade in chemicals. Under the proposed scheme, importing countries would be alerted prior to or at the time of an export of a banned substance and then would be provided upon request with sufficient information to make their own decision as to necessary control actions. This is an important step forward.

The United Nations has also been working on codes of conduct which would set needed standards for multinationals marketing hazardous goods. In May 1981, the World health organization adopted a code of marketing practices for infant formula. More general codes of conduct for transnational corporations and the transfer of technology, which would require the disclosure of known environmental and health hazards, have been under negotiation for several years. Finally, it has been suggested that international standards be developed for trade in pharmaceuticals and toxic chemicals. While continued resistance to such efforts may be expected from multinational companies and industrialized nations, I believe that the 1980s will witness a growing public demand worldwide for action.

AN EROSION OF AMERICAN LEADERSHIP

In the decade since Stockholm, the United States has been the world's leader in the protection of public health and the environment. Our example provided an important impetus to other nations. We shared our knowledge and expertise and provided strong encouragement for international cooperation.

The fact that many Americans feel deeply that it is simply unethical or immoral to allow the dumping overseas of banned products is reflected in our nation's laws. Even the National Agricultural Chemicals Association has publicly acknowledged the need for some regulation of pesticide exports. However, there remain substantial inconsistencies in the treatment of exports in our country's substance control statutes. On one extreme, there is a total prohibition on sales abroad of drugs not approved for use in the United States. On the other, contaminated foods may be shipped abroad without even any notice to importing governments.

An inter-agency task force established by the Carter Administration labored for two-and-one-half years to define an overall U.S. policy on hazardous exports. Just five days before leaving office in January 1981, President Carter issued an Executive Order, which strengthened the existing export notice requirements for banned consumer products, toxic chemicals, and pesticides. Perhaps the most controversial aspect of the Carter Order was the possible application of formal export controls to halt the sale abroad of a few "extremely hazardous" products. A sufficiently cumbersome procedure assured that only a small number of products, if any, would actually be subject to such controls. Nonetheless, the approach taken by the Carter Administration would have facilitated action to stop the most egregious cases of "dumping."

The controversy over U.S. hazardous export policy did not end with the Executive Order. Elements of the American business community argued that it went too far and made the U.S. "the world's nanny." Some environmental and consumer groups said the Order did not go far enough and argued for a total embargo on sales abroad of any product banned at home. They questioned the Order's primary reliance on export notifications, in light of the inadequate regulatory capabilities in many developing nations.

Yet American experience with export notices demonstrates that they do work. Canada, South Korea, and Mexico are among the nations which, when notified by the U.S., have taken action against imports of dangerous products and chemical wastes, including cancer-causing PCBs and children's lamps coated with lead paint. Also, just the existence of export notice requirements apparently has deterred such exports.

Thirty-four days later, on February 17, 1981, President Reagan revoked the Carter Order and directed the Departments of State and Commerce to reconsider U.S. policy with a view towards accomplishing the same objectivs at less cost. In contrast to the extensive consultations with industry and citizen groups undertaken by the Carter Administration, the Reagan rereview has been carried out behind closed doors.

In May 1981, the Reagan Administration put the United States in the untenable position of being the only nation in the world to vote against the WHO code of marketing practices on infant formula. The Administration's assertions that the code represented an assault upon private enterprise rang hollow and were soundly rejected by the American public and the Congress. Just two weeks ago, the Nestle Corporation, the world's major producer of infant formula and the target of an international boycott, announced its intention to abide by this code.

In September 1981, a copy of the draft State/Commerce report leaked to press revealed the Reagan Administration's desire to return to a laissez faire policy on hazardous exports. It called for changes in federal statutes to delete export notices for banned pesticides and toxic chemicals. In spite of the adverse reaction, the report has not been altered and indeed the Commerce Department has reportedly added a recommendation that the current prohibition on U.S. exports of unapproved drugs be lifted. There is little evidence that Congress would go along with the Reagan Administration's desire to open the floodgates to "dumping."

It is a tragedy that the Reagan Administration appears determined to abandon American leadership on the hazardous export issue just at time when there appears to be growing acceptance of responsibility by other exporting nations and multinational companies. The problem will not go away nor will it be solved by the "magic of the marketplace." My hope is that the Administration will realize that the path that it is now following is not in the best interests of our nation. My hope is that it will see the tenth anniversary of the Stockholm Conference as an opportunity to reassert our commitment to cooperate with other nations in tackling this problem.

Mr. **Bonker**. Dr. Oppenheimer, you are going to have the last word.

STATEMENT OF MICHAEL OPPENHEIMER, SENIOR SCIENTIST, ENVIRONMENTAL DEFENSE FUND

Mr. **Oppenheimer**. Mr. Chairman, I am going to discuss the state of the atmosphere and I am going to restrict my remarks primarily to problems many people have become concerned with; namely, the greenhouse effect and acid rain, with a few remarks regarding stratospheric ozone.

Just to refresh memories, the greenhouse effect arises because the climate of the Earth is determined largely by the balance between radiation coming in from the Sun and radiation going back into space from the surface of the Earth and from the atmosphere. The particular nature of that balance is critical to the determination of climate.

It turns out that trace gases, primarily carbon dioxide in the atmosphere, determine that balance in large degree. If we change the concentration of trace gases in the atmosphere, we change the nature of that balance and therefore affect climate.

It has been recognized for some time that this is the case. In fact, the greenhouse effect was identified as related to trace constituents in the atmosphere 40 years ago. At least for the last 25 years the importance of carbon dioxide in potentially affecting the climate of the Earth has been recognized; the burning of fossil fuel releases enough carbon dioxide to affect significantly its concentration in the atmosphere. Therefore, quite some time ago, people became concerned that in some way these releases would affect our climate.

Over the last decade, the understanding of the greenhouse effect and the monitoring of carbon dioxide in the atmosphere have advanced significantly. I will just quickly outline the progress we have made in understanding this problem over the last decade.

Atmospheric concentrations of carbon dioxide have increased monotonically to about 336 ppm in 1980 from about 315 ppm in 1958. These are actual measured values so we know how fast carbon dioxide is increasing in the atmosphere.

The increase in carbon is generally attributed to fossil fuel burning. Measurements indicate that an amount equivalent to about half of the carbon dioxide emitted from fossil fuel burning actually remains in the atmosphere with the rest going into various sinks like ocean and biosphere.

If carbon dioxide emissions continue to increase at the current rate, the global concentration of carbon dioxide in the atmosphere will double by the year 2030. The amount of carbon dioxide potentially available if we exploit all available fossil fuels is sufficient to increase the amount of carbon dioxide in the atmosphere by a factor of 5 or 10.

Now the effect of just the doubling that is expected to occur by approximately 2030 in carbon dioxide on our climate is a matter of considerable uncertainty. However, over the last decade there has been extensive effort at modeling the perturbation one would expect to experience.

Various climate models which have been developed predict a global average warming of 2 to 3° C which would accompany the doubling. There would be a more significant warming at the poles and less significant warming near the Equator.

It is the general consensus of opinion that the model serve at least as a qualitative guide to the kind of climate change we could expect but because of various uncertainties, the exact temperature changes might be uncertain by as much as a factor of 2. However, the consensus seems to have settled recently on the number of 2½ to 3° C as the kind of average global temperature change we can expect by roughly 2030 if the present trends in fossil fuel use continue.

The predicted temperature changes can be expected to result in a redistribution of precipitation about the global and substantial changes in climate and all natural systems affected by climate. For instance, there is expected to be a general warming and drying of the U.S. Great Plains agricultural belt, general shifts in the distribution of agriculturally productive areas about the globe are expected. A rise in sea levels accompanying the disintegration of the West Antarctic ice sheet could potentially flood coastal areas. However, the latter scenario is not expected to develop until perhaps the 22d century, although there is considerable controversy about that point.

What I am particularly disturbed about is the discovery in the last 7 or 8 years that other trace gases aside from carbon dioxide may play a significant role in the greenhouse effect. Methane, various chlorofluorocarbons, and nitrous oxide are among those gases. Their net effect may be comparable to that of carbon dioxide. In other words, the predicted climate change may occur sooner if other trace gas emissions continue to grow to the extent they have grown over the last decade.

There is an area of great uncertainty but obviously of great concern because it makes dealing with the problem a lot more difficult. An increase in atmospheric carbon dioxide is definitely occurring. If this increase is allowed to continue at the present rate it will almost certainly lead to a global warming over the next 50 years.

The best current estimate is that the size of the warming within 50 years will exceed any change in temperature which has occurred naturally over the last 10,000 years or so. This is something way out of our experience. And it will occur much more rapidly than natural temperature variations tend to occur. Of course, the ability of society to cope with such changes is open to severe question.

As an environmentalist, I find that such an outcome is totally unacceptable. By the time we have direct proof in hand that the world is actually getting warmer we will probably be well into the predicted warming since changes of about less than one-half degree are difficult to separate from natural variations. At that time, within about 20 years from now, a change in the course of our carbon dioxide production will be very difficult to affect in a timescale which will avoid significant climate change so the time to start doing something about this problem is now.

The sensible course is to decrease the rate of growth of fossil fuel use and the time is now appropriate for international efforts to plan this growth rate adjustment. It is a problem which involves all the nations of the world although at this time the United States plays a disproportionate role in the production of carbon dioxide from fossil fuels.

A prudent course and one which can be undertaken immediately is a substitution of renewable resource energy alternatives for fossil fuel consumption. Such alternatives include increased end use production efficiency such as cogeneration and conservation, and increased use of solar based sources of energy.

This approach can at least delay the incipient climate change in expectation of technological advances in non-fossil-fuel alternatives. The problem of the trace gases, aside from carbon dioxide, is much more difficult to deal with. The other side of the problem is that nitrous oxide and methane are both produced during the use of fossil fuels and to some extent may be reduced by the same strategies which reduce carbon dioxide.

Chlorofluorocarbons are produced for a variety of commercial uses. Of course, these compounds have been implicated in the destruction of the stratospheric ozone layer, and I point you to the National Academy of Sciences report which was issued just today confirming that that is indeed a problem.[1]

We have probably already experienced some degree of deterioration in the ozone layer and we can expect an ultimate deterioration of perhaps as much as 9 percent, which could result in a doubling of the intensity of penetrating ultraviolet radiation and increased coincidence of certain types of cancer.

Now as a general summary to this particular part of my testimony, the appearance of chlorofluorocarbon compounds in that context just emphasizes the point that we are creating a variety of anthropogenic byproducts and that we can't continue to do that without experiencing significant global consequences. No one nation can safeguard the joint air resource. What is required is an international effort to manage our atmospheric resource which treats clean air as a scarce commodity.

We can't just go dumping even small quantities of trace gases into the atmosphere. Since the United States is currently the single largest producer of these atmospheric perturbations, and is in the best position to effect changes in its own production of trace gases, the United States should take the lead.

Now just turning briefly to acid deposition. I have spent a lot of time on this problem in the last year and focusing on North America, we have a problem which is very well understood and the solution to which is very well understood, but we have a significant degree of political inaction on the problem which is very disturbing.

There is 10 to 20 times more manmade sulfur and nitrogen put into the atmosphere in Eastern North America than from natural sources. That is, 95 percent of the sulfur in the Eastern North America airshed occurs due to manmade activity. Seventy percent of that material results from utility powerplant emissions. It is a remarkable centralization of the problem in a sense, making it in one way very easy to deal with.

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[1] See news article in app. 24.

However, over the last decade, nitrogen emissions have been increasing relative to sulfur and there are indications that this is becoming a more important part of the problem.

Now, the international aspect of the acid deposition problem has been confirmed by a whole host of modeling efforts. The consensus scientific view represented in the working group reports under the United States-Canada memorandum of intent on transboundary air pollution is that the U.S. sources contribute as much to sulfur deposition in Canada as Canadian sources, which is a rather remarkable conclusion.

Furthermore, the United States contributes five times more to deposition in Canada than Canada does to deposition in the United States. The regional aquatic damage is well documented in the working group reports. Acid deposition is increasing in this country. In the last decade or so, documentation of the spread in the Southeast, in the Sierra Nevada and in the Rockies has come through plain and clear.

There is a serious, widespread problem. There are indications it has become a global problem. With no change in current regulatory policy, acid deposition will continue at current levels in the Northeast and probably increase elsewhere. Current levels are far beyond the level which can be considered healthy, especially from the viewpoint of aquatic resources. And increasing widespread damage can be expected to occur in the natural environment.

The sad part is that the technology exists to reduce sulfur emissions by 90 percent and significantly reduce nitrogen emissions from existing sources, but we don't seem to have the will to do anything about the problem.

As far as international efforts are concerned, I want to point out that the working groups under the memorandum of intent have been extremely effective in producing a consensus scientific view on this issue and those efforts need to be supported.

In conclusion, it is clear we understand both the sources and cures for acid rain. In North America the United States bears the greatest responsibility for the problem. Like carbon dioxide, acid rain is a byproduct of fossil fuel using. Unlike the carbon dioxide, cost-effective technological solutions are at hand in the short run without large-scale decreases in fossil fuel usage. A long term solution would involve lessened dependence on fossil fuels.

The greenhouse effect and acid rain are two international consequences of fossil fuel burning. The more local negative impacts of this energy source have been appreciated for years. A long-term approach to environmentally sound energy production would mitigate in favor of an energy path from here which minimizes to the extent feasible and consistent with other environmental considerations, our dependence on fossil fuels, replacing them with renewable resource alternatives.

I will make one further comment. I have noted the destruction of the stratospheric ozone layer and the climate perturbation produced by fossil fuel burning. We have all noticed the recent interest in this country in arms control. It should be recalled that one of the gravest perturbations to the atmosphere which could occur would be a large-scale exchange of nuclear weapons. The perturbations which occur on a short-term scale subsequent to a nuclear exchange are similar to those already occurring on a longtime scale from other sources.

These include a large-scale disruption of the ozone layer and potential climate change which would sustain themselves long after the nuclear exchange occurred.

[Mr. Oppenheimer's prepared statement follows:]

PREPARED STATEMENT OF MICHAEL OPPENHEIMER, SENIOR SCIENTIST, ENVIRONMENTAL DEFENSE FUND, INC.

Mr. Chairman, my name is Dr. Michael Oppenheimer. I am the senior scientist in the New York office of the Environmental Defense Fund, a private non-profit organization. My field of research is atmospheric physics.

I would like to thank you for the opportunity to testify before this Committee on the topic of the atmospheric environment from an international perspective against the background of the Stockholm Conference. There are many aspects of this topic which merit exploration, but time will limit me to the detailed consideration of just two which have stirred considerable discussion in the scientific community over the last decade: the greenhouse effect and acid deposition. I shall also remark briefly on the depletion of stratospheric ozone.

The recommendations of the Stockholm Conference in 1972 included increased monitoring of carbon dioxide, which contributes to the greenhouse effect, and sulfur and nitrogen oxides and particulates, which cause acid rain. However, while the potential scope of the greenhouse effect has been understood for decades, it appears that

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the scope of the acid rain problem and the threat to the ozone layer from anthropogenic gases were not appreciated in 1972. Since that time, international monitoring and modelling efforts have played a significant role in defining the scientific understanding of these problems. In the following pages, I shall outline our current understanding of these areas, try to anticipate future trends, and make a few recommendations of possible courses of action.

The Greenhouse Effect

Radiant energy from the sun, including visible light, is absorbed in the atmosphere and at the earth's surface. In response to this incoming energy, the earth and its atmosphere are heated. As the earth heats, it re-radiates energy, largely at infrared wavelengths different from the incoming radiation. The atmosphere acts as a filter or a greenhouse, allowing most incoming energy through but trapping most outgoing infrared radiation from the earth's surface. The amount of radiation which can escape at particular wavelengths influences climate since trapped radiation tends to heat the atmosphere.

It has been recognised for some time that the concentration of trace gases determines the amount of infrared radiation which is trapped. For the last twenty-five years, the trace gas of primary concern has been carbon dioxide (CO_2). The burning of fossil fuel releases enough carbon dioxide to affect significantly its concentration in the atmosphere. Furthermore, carbon dioxide absorbs a sufficient fraction of the infrared radiation emitted from the earth's surface to affect the atmospheric temperature. Thus, there arose concern that the use of fossil fuels would alter the earth's climate, with potentially significant consequences for our society and its environment.

Over the last decade, atmospheric monitoring and climate modeling have led to an improved understanding of this problem. I shall now outline our current state of understanding of the greenhouse effect and its potential consequences.

1. Atmospheric concentrations of CO_2 have increased monotonically to about 336 ppm in 1980 from about 315 ppm in 1958. These are actual measured values. The natural pre-industrial CO_2 concentration is estimated at 265-290 ppm. So atmospheric CO_2 has increased by 16-27 percent since pre-industrial times.

2. The increase in atmospheric CO_2 is generally attributed to fossil fuel burning. CO_2 emissions from this source increased by 4.3 percent per year until 1970. Since 1970, the rate of growth in industrial CO_2 emissions has decreased to 3.6 percent per year.

3. Measurements indicate that an amount equivalent to about half of the emitted CO_2 remains in the atmosphere. The rest resides in the ocean, biosphere, or is consumed by geological weathering. Assuming this fraction remains constant, it is possible to extrapolate atmospheric CO_2 concentrations to future decades by projecting various patterns of fossil fuel usage.

Various scenarios have been proposed for the growth in global CO_2 production. If CO_2 emissions continue to increase at the current rate, the global concentration will double by about the year 2030. If the overall growth rate for CO_2 pollution is only one-half the current value, the doubling will occur by about 2080.

4. However, the biosphere may be a significant source of CO_2, rather than a sink, through deforestation. If such is the case, the natural sinks for CO_2 have been underestimated, and a decrease in deforestation could significantly delay any climate change. However, the present scientific consensus is that deforestation is not a major CO_2 source. Projected CO_2 trends also could be in error if the efficiency of the ocean or biospheric sinks were to deviate from the current 50 percent.

5. The amount of CO_2 potentially available from fossil fuels is sufficient to increase the atmospheric burden of CO_2 by 5-10 times the current value, if the efficiency of the various sinks remains unchanged.

6. The effect of a doubling of CO_2 on our climate is a matter of considerable uncertainty. Various climate models developed over the last decade predict a global average warming of about 2°-$3^{\circ}C$ accompanying the CO_2 doubling. The warming would be higher near the poles (with some predictions of Arctic temperature increases as high as $10^{\circ}C$) and lower near the equator. The ability

of the deep ocean to absorb energy is generally ignored. However, it should be noted that recent efforts to model the role of the deep ocean indicate that significant temperature increases can still occur over land areas even if the ability of the ocean to absorb energy is exaggerated. In general, the consensus of opinion is that the models now serve as a useful qualitative guide to climate change but because of uncertainties over the role of the oceans and the water cycle in absorbing energy, the quantitative predictions are subject to uncertainties of a factor of 2 or so.

7. The predicted temperature changes can be expected to result in a redistribution of precipitation about the globe and substantial changes in climate and all natural systems affected by climate. A general warming and drying of the U.S. Great Plains agricultural belt is predicted. General shifts in the distribution of agriculturally productive areas of the globe are expected. A rise in sea levels accompanying the disintegration of the West Antarctic Ice Sheet could flood coastal areas, although most experts consider the latter eventuality an unlikely scenario for the next century.

8. A disturbing discovery of the last decade is that trace gases aside from CO_2 may play a significant role in the greenhouse effect. Methane, various chlorofluorocarbons, and nitrous oxide are among these gases. Their net effect may be comparable to that of CO_2. In other words, the predicted climate change may occur sooner if other trace gas emissions continue to grow.

9. Regardless of whether any particular scenario is correct, we can conclude the following: an increase in atmospheric carbon dioxide is occurring. If this increase is allowed to continue at the present rate, it will almost certainly lead to a global warming over the next 50 years. The best current estimate is that the size of the warming within 50 years will exceed any change in temperature which has occurred naturally over the last 10,000 years, and will occur much more rapidly than natural temperature variations tend to occur. From an ecological point of view, such rapid change is undesirable. Furthermore, fluctuations about the mean climate behavior of unknown magnitude will occur. The alterations to our natural environment due to such changes would be substantial, exceeding any changes within our experience and possibly exceeding our societal ability to cope with the changes. In addition, even the most conservative estimates suggest that some significant climate change will occur eventually if the growth of CO_2 and other trace gas emissions are not limited.

As an environmentalist, I find that such an outcome is certainly unacceptable. Observations of current temperature trends do not provide us with unambiguous information as to what the size of climate change induced by CO_2 will be. However, by the time such direct information is at hand, we will probably be well into the predicted warming, since changes of less than one-half degree are difficult to separate from natural variations. At that time, perhaps twenty years hence, a change in the course of our CO_2

production will be difficult to affect in a timescale which will avoid significant climate change.

What is a sensible course of action in the face of a problem of this scope? We need to decrease the rate of growth of fossil fuel use, and the time is appropriate for international efforts to plan this growth rate adjustment. It is conceivable that electric power stations could use a flue gas removal process for CO_2, but the cost of such processes is very large and the enormity of the disposal problem dwarfs that for sulfur removal. Furthermore, the electric power source is at this time only a fraction of CO_2 production. Technologies for atmospheric removal of CO_2 are unrealistic at this time, and reforestation can play only a limited role in the overall carbon balance. However, significant deforestation can only aggravate the problem, and reforestation, though of limited potential value,can certainly play a role.

A prudent course, and one which can be undertaken immediately, is the substitution of renewable resource energy alternatives for fossil fuel consumption. Such alternatives include increased end-use and production efficiency (e.g., conservation and cogeneration) and increased use of solar-based sources of energy. This approach can at least delay the incipient climate change in expectation of technological advances in non-fossil fuel alternatives. Since many of these energy options are currently cost effective, significant near-term advances, at least in the U. S., can be achieved.

The problem of the trace gases may be more difficult to deal with. Nitrous oxide and methane are both produced during the use of fossil fuels and may be reduced to some degree by the same strategies which deal with CO_2. Chlorofluorocarbon compounds are produced for a variety of commercial uses. These compounds were postulated in the early 1970's as chemical removers of ozone in the stratosphere. Since the stratospheric ozone layer protects the biological systems on the earth's surface from solar ultraviolet radiation, its potential degradation became a cause for alarm. Various harmful effects of decreased stratospheric ozone were advanced, including increased incidence of skin cancer. The past decade has seen a significant effort put into understanding the photochemistry of ozone depletion. Current estimates are that a 5-9 percent reduction in stratospheric ozone by the end of the next century will proceed from current rates of chlorofluorocarbon use. The ultraviolet stress to our environment from this change is of grave concern. Limited evidence from satellite observations suggests that the depletion of ozone may have already occurred to a measurable degree. Whether this depletion is due to chlorofluorocarbons is a matter of current debate. Of particular interest in the current context is the suggestion that CO_2 enhancement may affect ozone depletion, and that chlorofluorocarbons also contribute to the greenhouse effect. These observations suggest the need for a more detailed understanding of the trophosphere, the stratosphere, their coupling, and their response to human activity. Along these lines, the original Stockholm recommendation of extensive monitoring of pollutants is still a first order of priority.

The appearance of chlorofluocarbon compounds in connection with both ozone depletion and the greenhouse effect suggests that there is a broad lesson in the observation of the significance of trace gases. We cannot continue to treat the atmosphere as a receptacle for a diverse variety of anthropogenic byproducts without expecting to experience global consequences. Furthermore, no one nation can, by its own efforts, safeguard this joint resource. What is required is an international effort to manage our atmospheric resource, treating clean air as a scarce commodity. However, the U.S. is currently the largest single producer of these atmospheric perturbations, and is in the best position to affect changes in its own production of trace gases. It is therefore imperative that the U.S. take the lead in efforts to manage the air resource.

Acid Rain

I shall restrict my testimony on acid rain to remarks which are particularly significant from the viewpoint of U.S.-Canada relations. A more complete analysis of acid rain from an atmospheric perspective is appended for submission to the hearing record (Appendix I).

1. Acid deposition in both wet and dry forms arises primarily from anthropogenic emission of the oxides of sulfur and nitrogen. In Eastern North America, man-made sources are 10-20 times larger than natural sources. Thus, there can be no doubt as to the origin of acid deposition in this region. The major source of atmospheric

sulfur is powerplant emissions, accounting for 70 percent of sulfur emitted in the Eastern U.S. Mobile sources are the largest single source of oxides of nitrogen, providing about 40 percent of the total, but powerplants add another 30 percent. Since about 70 percent of acid rain (wet deposition) in the region arises from sulfur emissions, it is clear that utility emissions are the major source of the problem. In Canada, about one-half of sulfur emissions originates in smelters, and mobile sources produce more than one-half of the oxides of nitrogen emitted.

Over the last decade, nitrogen emissions have been increasing relative to sulfur emissions, and there are indications that nitrates are increasing relative to sulfates in precipitation.

2. The international aspect of acid rain in Eastern North America has been confirmed by a range of modeling efforts. The consensus scientific view, represented by the reports of the Working Groups under the U.S.-Canada Memorandum of Intent on Transboundary Air Pollution, is that U.S. sources contribute as much to sulfur deposition in Canada as do Canadian sources. Furthermore, the U.S. contributes five times more to deposition in Canada than Canda does to deposition in the U.S.

3. The regional aquatic damage caused by acid rain is well documented in the Working Group documents. Recent reports on suspected damage to forests due to acid deposition are particularly discouraging, as are reports of drinking water pollution by acid-leached toxic metals.

4. Acid deposition may not be worsening in the heavily affected Northeast, but it does appear to be spreading to the Southeast, the Rockies and the Sierra Nevada.

5. Remote monitoring of rainfall pH suggests that global transport of pollutants may be affecting rainfall at some locations.

6. Recent analyses of acid deposition suggest that total pollutant deposited regionally, not just pH of rain, determine ecosystem acidification. Since the total deposition appears to respond more or less proportionally, in a regional sense, to total emissions changes, we can be fairly sure that regional sulfur and nitrogen emissions reductions will lead to comparable reductions in acid deposition.

7. With no change in current regulatory policy, acid deposition will continue at current levels in the Northeast and probably increase elsewhere. Current levels are far beyond the level which may be considered healthy, especially from the viewpoint of aquatic resources, and increasing, widespread damage can be expected to occur to the natural environment.

8. The technology exists to reduce utility sulfur emissions by up to 90 percent and to significantly reduce nitrogen emissions from existing sources. A combination of emissions reductions strategies, including flue gas desulfurization, could eliminate acid rain as a threat to our environment at a cost which is comparable to or less than that of the known, measurable damage sustained.

9. The efforts of the Working Groups under the U.S.-Canada Memorandum of Intent have been extremely important in focusing the issues, and producing a credible scientific picture of our state of knowledge on acid rain. I would strongly urge that this effort be continued as a vehicle for the formation of scientific consensus on this issue.

In conclusion, it is clear that we understand both the sources and cures for acid rain, and that the U.S. bears the greatest part of responsibility for the regional problem in the Northeast. Like the CO_2 problem, acid rain is a byproduct of fossil fuel usage. Unlike the CO_2 problem, cost-effective technological solutions are at hand in the short run without large scale decrease in fossil fuel usage. A long term solution would involve lessened dependence on fossil fuels.

The greenhouse effect and acid rain are two international consequences of fossil fuel burning. The more local negative impacts of this energy source have been appreciated for years. A long term approach to environmentally sound energy production would mitigate in favor of an energy path from here which minimizes to the extent feasible and consistent with other environmental considerations, our dependence on fossil fuels, replacing them with renewable resource alternatives.

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ENVIRONMENTAL DEFENSE FUND

APPENDIX I

ACID RAIN

A SUMMARY OF SCIENTIFIC UNDERSTANDING

(1) Precipitation over most of the eastern United States including the Southeast is abnormally acidic, ranging up to 20 to 40 times more acidic than normal on an annual average basis in parts of the Northeast. Acid rain also has appeared in the Rockies and is widespread in California. Rainfall in the East is primarily a dilute solution of sulfuric acid while in the West it may be primarily either nitric acid or sulfuric acid. There is no question that precipitation acidity substantially exceeds the natural background value.

(2) Atmospheric loading of sulfur and nitrogen compounds is by far the major source of acid rain. In eastern North America, atmospheric loading of sulfur and nitrogen due to human industrial and transportation activity far exceeds that from natural sources. Natural sources of sulfur in the eastern U.S., much less than one million tons per year, are far too small to account for the sulfur, mostly in sulfuric acid, actually observed in precipitation, about three million tons per year. For comparison, man-made sources of sulfur amount to nearly 12 million tons per year (equivalent to 24 million tons of SO_2). Approximately two-thirds of the total U.S. sulfur loading is from power plants, which also provide nearly

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30% of the atmospheric loadings of oxides and nitrogen. Emissions from the transportation sector are another major source of oxides of nitrogen (NO_x), providing over 40% of the national total. Since, on average, nearly three-fourths of the acid in eastern U.S. precipitation is due to sulfuric acid, and since utilities are responsible for more than 70% of eastern U.S. sulfur emissions, it is certain that utilities are the major source of acid rain in the East. The recently issued report of the National Academy of Sciences confirms this conclusion.

(3) The detailed mechanisms for the transformation of sulfur dioxide (SO_2) and NO_x emissions into acid rain are not completely understood, but there is absolutely no doubt that the transformation occurs. I have spent most of the past year researching this transformation. A general description of the process is the following: SO_2 and NO_x emissions from various sources are mixed into the lower atmosphere with moisture and other pollutants. Out of this chemical soup, various nitrates and sulfates are produced, among them nitric acid and sulfuric acid. Some of this material is periodically rained out in precipitation and some remains suspended as fine particles. Many of these fine particles as well as untransformed sulfur dioxide atoms, are eventually deposited as dry acid material in a process called dry deposition. In many areas, dry deposition is a major sulfur deposition mechanism. Thus, the acid rain and fine particle problems are intimately related.

Let us examine the transformotion process more closely. Substantial evidence has accumulated that nearly all SO_2 absorbed into droplets is converted to sulfates, mostly sulfuric acid, and that this process is the major source of precipitation sulfuric acid.

Furthermore, recent studies indicate that considerable oxidant is available for the oxidation of sulfur dioxide in precipitation and cloud water, and that this process is not inhibited by decreasing pH. My own research indicates that this aqueous phase transformation process enables the level of sulfuric acid in precipitation to respond to changes in the level of atmospheric SO_2. In other words, substantial reductions in atmospheric SO_2 should lead to significant, although not necessarily equal, reductions in sulfuric acid in rainfall. Regardless of the details of the transformation processes, the results of both long-range transport modeling and precipitation monitoring networks are consistent with the notion that reducing atmospheric SO_2 through emissions reductions will lead to significantly lower levels of sulfur wet deposition , atmospheric sulfate particles, dry deposition and precipitation acidity.

I would like to emphasize that the SO_2 and NO_x which are not converted into acids in the atmosphere and deposited in rainfall are still a source of environmental damage. Unconverted SO_2 is eventually deposited on land, water, plants, and trees and much of this material is then converted to acid. Suspended fine particles present a health hazard when inhaled by humans. Much of the fine particulate matter is eventually deposited on leaves, soil, and surface water and, along with the dry sulfur dioxide, contributes perhaps an additional 30% to ecosystem acidification. Thus, almost all of the SO_2 originally emitted ends up on the earth's surface in one harmful form or another. In addition to a decrease in the acidity of precipitation, therefore, a decrease in SO_2 emissions will reduce environmental damage caused by dry deposition. The reduction in dry deposition of SO_2 will occur at least in direct proportion to the reduction in sulfur dioxide emissions.

(4) Long range transport plays a vital role in the distribution of acid rain, sulfur dioxide, and fine particles about the country. Recent atmospheric modeling summarized in the report of the Working Group on Atmospheric Modeling Under the U.S.-Canada Memorandum of Intent on Trans-Boundary Air Pollution and the Second Report of the U.S.-Canada Research Consultation Group on the Long-Range Transport of Air Pollutants provides a general picture of this process. There is little doubt that most of the wet deposited sulfur including sulfuric acid reaching the Adirondacks, for instance, originates outside the Mid-Atlantic region, largely in the Ohio River Basin and the Upper Midwest. The contribution of U.S. sources to sulfur deposition in Canada is about equal to the contribution of Canadian sources to sulfur deposition in Canada. Furthermore, the U.S. contributes five times more to deposition in Canada than Canada does to deposition in the U.S.

There has been at least one study widely circulated which purports to show that local sources in the Northeast constitute the main source of sulfates in that region. I have carefully studied this report by researchers at PEDCo Environmental, Inc., commissioned by the Department of Energy, and find that the assumptions made concerning the rate with which sulfur is transformed are without basis and at odds with the best scientific evidence. Using more reasonable assumptions, even the model used in that report would tend to substantiate the findings of the Working Group that 70% or more of the sulfate over the Adirondacks originates outside the local region. (The report, for instance, assumes a degree of sulfur transformation in power plant plumes which is three times larger than generally accepted.)

Further evidence of the significance of long-range transport comes from satellite photographs of pollution episodes combined with simultaneous ambient air measurements. These measurements show the large scale relationship of sulfates, ozone, TSP, and reduced visibility over the East. Trajectory analysis also has demonstrated that specific instances of atmospheric stagnation in the Midwest are correlated with enhanced sulfate levels at later times in the East. Research performed in conjunction with the SURE studies has confirmed the existance of long-range transport of sulfates. The reality and significance of long range transport is no longer in doubt.

(5) Historical data on precipitation acidity over the last 20-30 years is not of high quality. However, these data do suggest a relationship between the construction of taller stacks and the spreading out of the region of abnormally acidic rainfall. Precipitation pH data from the 1950's, even when corrected for the possible neutralizing effects of drought-generated dust, indicate a spreading of the region affected by acid precipitation, in spite of the fact that total U.S. sulfur emissions have not changed much. However, the fraction of emissions generated by utilities commonly emitting through tall stacks has increased markedly in the last several decades. Furthermore, the few measurements made in the 1930's indicate that rainfall in the Northeast was much less acidic at that time. A glance at a map of precipitation acidity in the U.S. clearly shows the intimate association of fossil fuel emission sources and abnormally acidic precipitation. Most

significantly, recent studies indicate that the decrease of sulfur emissions in the Northeast over the last decade, has in fact been accompanied by a decrease in sulfate deposition levels, a fact which should lead us to anticipate the success of an emissions reduction strategy.

(6) Arguments have been made that low rainfall pH measurements at a few remote island stations mean that rainfall is normally very acidic. I would like to emphasize the complete irrelevance of this argument to the eastern U.S. where man-made sources of acidity far outweigh natural sources. Furthermore, some natural sources of sulfur are more significant for these island stations than for the U.S. mainland. Finally, these observations may simply indicate the importance of global transport of pollutants at certain locations since some remote stations report normal pH levels of 5.6.

In summary, it is certain that precipitation in the U.S. is now far more acidic than it would be in the absence of human activity. The primary source of this acidification, especially in the eastern U.S. is utility emissions, mainly of sulfur dioxide. There is now strong evidence that substantial reductions in utility sulfur dioxide emissions will lead to significant reductions in wet sulfur deposition, precipitation acidity and suspended sulfates. It is certain that the problems associated with sulfur deposition in its various forms cannot be solved without reductions of utility SO_2 emissions. However, mobile sources continue to be a significant component of this problem, and their relative importance will increase as utility emissions are reduced. Therefore, it is critical that tailpipe NO_x standards not be relaxed.

Let me now address the subject of health effects associated with this problem. It is particularly important that significant atmospheric sulfate level reductions can be expected to accompany an SO_2 emissions reduction program, given the human health implications of atmospheric sulfates. Sulfates, which occur almost entirely as fine particles, and are not separately regulated under the health standards of the Clean Air Act, are shown in some studies to be more damaging to human health than sulfur dioxide. Direct epidemiological evidence exists of health damage at sulfate levels which correspond to the regional component of Northeast ambient sulfates. In other words, the interstate component of the sulfates may play a significant role in adverse health impacts of pollution. In addition, epidemiological evidence concerning sulfates was sufficient to convince California to enact a sulfate standard. The long range transport component of sulfates creates potential PSD increment consumption and ambient air quality maintenance and attainment problems in some areas and has been the subject of litigation among various states. Thus, we are concerned that the fine particles which are an integral part of the acid rain problem may be causing widespread health damage in the Northeast.

Furthermore, SO_2, which is the original source of the sulfates, itself participates in long range transport in the Northeast. This component of SO_2 also contributes to ambient air standards maintenance and attainment problems in some areas, and thus potentially to health impacts. For instance, long range transport models indicate that less than one-third of the average SO_2 concentration in the New York State air is due to New York State emissions. In addition, synergistic health effects of sulfates, ozone and SO_2, all of which participate in long range transport, are little understood. What little evidence exists in this area is not encouraging.

My conclusion, as a scientist, is that enough is known about the sources of acid rain to initiate a long-term control program aimed at the abatement of emissions of sulfur dioxide and oxides of nitrogen. Since utility sulfur dioxide emissions are the major single source of the precursors of acid rain, these emissions should be the initial target of a control strategy such as that proposed by the National Clean Air Coalition. The potential for human health damage from fine particles, in addition to the documented damage to our natural environment, underscores the urgency of the problem.

Mr. **Bonker**. Thank you, Dr. Oppenheimer.

With respect to acid rain, the subcommittee has been interested in that subject as have been other subcommittees in the House. You say there is a potential for a scientific consensus on the issue, that you know both the causes and the cures for acid rain and what we need now is a political consensus to deal with it.

Mr. **Oppenheimer**. That's correct.

Mr. **Bonker**. That seems to summarize what I have heard today, that we can identify the problems and what needs to be done, but we lack a political consensus or political will to bring about those solutions.

I wish we had time for questions. The subcommittee staff has prepared a set of questions which I may send to you and ask for a response to be placed in the official record, but the time has really run out so we will have to deal with it in written form.

I thank each of you for being here today and highlighting certain aspects of this enormous question of global environment. We really feel that your testimony, indeed, the three hearings that we have scheduled, will constitute a record which I think will be worthy of wide distribution as we attempt to reinforce what people have seen now in the Global 2000 reports. I hope we can use this as kind of a conscience, a global conscience to deal with these enormous environmental problems.

The subcommittee stands adjourned.

[Whereupon, at 4:30 p.m., the subcommittee adjourned.]

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REVIEW OF THE GLOBAL ENVIRONMENT TEN YEARS AFTER STOCKHOLM

TUESDAY, APRIL 20, 1982

House of Representatives,
Committee on Foreign Affairs,
Subcommittee on Human Rights and
International Organizations,
Washington, D.C.

The subcommittee met at 2:40 p.m., in room 2255, Rayburn House Office Building, Hon. Don Bonker (chairman of the subcommittee) presiding.

Mr. Bonker. The subcommittee will come to order.

The Subcommittee on Human Rights and International Organizations is meeting this afternoon for the third in a series of hearings to review the status of the global environment on the 10th anniversary of the Stockholm Conference.

Witnesses during the first two hearings described the major accomplishments and failures in achieving the goals set forth at Stockholm. We have heard from a number of witnesses, most of whom have rated our progress since that time as mediocre. Nevertheless, several common themes have emerged during the hearings: (1) That no one nation acting alone can successfully tackle international environmental problems; (2) that by the time we have concrete scientific proof about the causes and effects of a particular action or trend, such as CO_2, any effort may come too late to have an impact on reversing the environmental damage; and (3) that the technical knowledge exists to solve many of the world's existing environmental problems, but the political will and leadership to apply the technology have been severely lacking.

Another common theme is that during the past decade, the United States has exercised exceptional leadership in international environmental affairs. Subject to debate, however, are whether the present administration is committed to devoting the resources necessary to maintain this leadership and whether, as the administration believes, free market forces and private enterprise hold the key to solving global environmental problems.

Today's hearing will look into the future in an attempt to establish an international environmental agenda for the coming decade. We will be examining the role the U.S. Government, international organizations, and private groups and industry can play in addressing global environmental issues and methods of dealing with environmental disputes.

We have a number of witnesses today. I think we will take them in basically two groups. The first will be the Honorable Richard Funkhouser, who is Director of the Office of International Activities of the Environmental Protection Agency.

Then we have four additional witnesses that we will have participate in a panel session. So at this time I would like to ask Mr. Funkhouser to come to the witness table.

STATEMENT OF RICHARD FUNKHOUSER, DIRECTOR, OFFICE OF INTERNATIONAL ACTIVITIES, ENVIRONMENTAL PROTECTION AGENCY, ACCOMPANIED BY WENDY GRIEDER

Mr. **Funkhouser**. Mr. Chairman, may I introduce Wendy Grieder, who has organized my mind and also my notes this morning.

I very much welcome the opportunity to be here today to participate in the subcommittee's hearings on the status of the global environment. It is especially appropriate that global environmental issues are being examined here and now, since the 10th anniversary of the Stockholm Conference will be commemorated by the United Nations environmental program's [UNEP] session of special character [SOSC] to be held in Nairobi May 10 to 18.

You ask what the role of EPA is on forming policy on global environmental issues. As you know, the basic mandate of the EPA is to protect the public health and welfare and the environment by serving as a domestic regulatory agency. In that capacity, the activities of EPA also have international implications and involvement. For that reason, EPA serves a necessary role in the formulation and implementation of U.S. policy on the global environment.

I perceive this role to be an extension of and a complement to the State Department's development and coordination of foreign policy as it relates to environmental matters.

EPA accomplishes this goal by providing much of the technical and scientific expertise to carry out the U.S. obligations. EPA scientists and technical experts attend international meetings and help to advance U.S. programs and policies. There are numerous activities related to information exchange and coordination of scientific research, both bilaterally and through international organizations.

I have attached to this statement a summary checklist of EPA's extensive international activities.[1]

EPA personnel participate in international negotiations on transboundary and global environmental issues, such as: Long-range transport of air pollution, ocean disposal of wastes, harmonization of chemical testing and chemical control programs.

EPA also coordinates and implements the export- and import-related policies and procedures under the Resource Conservation and Recovery Act [RCRA], Federal Insecticide, Fungicide and Rodenticide Act [FIFRA], and the Toxic Substances Control Act [TSCA].

EPA is the world's largest organization dedicated to the protection of the environment. We have done a little research on that, which I would be glad to expand on. EPA works hard to fulfill its major responsibilities, predominately domestically, but also within the international community.

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[1] See p. 307.

In that respect, EPA reflects at home and abroad, hopefully, the general policies of this administration, for example, to decentralize to the extent feasible, to economize, to utilize the private sector in addressing environmental problems. Greater efforts are being made and need to be made to integrate all public and private, domestic and foreign instrumentalities into activities to address and redress environmental problems.

You ask what role international organizations should play in resolving international problems. They play a key role in advancement of understanding of global environmental problems. International cooperation is vital to the development of appropriate scientific research assessments and the responses necessary for the resolution of common environmental problems.

However, it is our conviction that international cooperation need not always result in international controls or in commitments by national governments to international control strategies, particularly in advance of thorough scientific investigation. Appropriate coordination among governments is the most effective way to achieve maximum environmental benefits at the international level.

You ask what are our U.S. priorities in global international affairs.

I believe, as Mr. Buckley and Alan Hill have testified, that the United States has been carrying out through a high level interagency work group on global issues, an examination of recent studies, including the Global 2000 Report, as part of a larger effort to establish U.S. priorities in global environmental affairs for the years ahead.

Global 2000 and other reports have initiated an open exchange of perspectives and ideas among Government agencies which has been particularly beneficial to development of U.S. policy. While the work of the global issues work group is still in an early stage, as you know, I would identify three areas of concern which will have priority focus:

First, strengthening the scientific analyses of environmental trends and problems as basis for improved policymaking. The need for improved environmental forecasting became clear through deficiencies of the Global 2000 Report, since many of its conclusions have been justifiably challenged by scientists on both scientific and analytical grounds.

Second, greater involvement of private sector institutions, including business and industry, in environmental protection programs at national and international levels. We believe the principle of self-adjusting market mechanisms can be appropriate for many environmental problems; the need for private sector initiatives for the resolution of environmental problems should not be underestimated.

Third, another priority for this administration is to improve coordination and greater efficiency within international organizations, particularly in view of budget constraints and potential for program duplications.

For example, the United States is working within international organizations to decrease duplication and increase specialization. Belt-tightening at home and abroad go together, particularly since the United States Government is the largest contributor in all international organizations. In this connection, I am attaching a list of the exceptional number of international activities of EPA in one field alone, acid precipitation.[1]

You ask what is the relationship between the protection of the global environment and economic growth, particularly in regard to the Third World. With regard to the Third World, we believe that sound environmental policies can benefit rich and poor nations alike. We do not believe that industrial progress and economic development need be antithetical to environmental protection.

Although industrialized countries may contribute to environmental problems, they also provide technology which has improved the environmental health and welfare of the lesser developed world.

The activities of the Organization for Economic Cooperation and Development [OECD] in addressing and assessing these global environmental problems are of primary importance. The OECD has made significant contributions to increased international awareness of past and potential environmental problems and has served as a most useful forum to exchange information and views on policy aspects of international environmental issues.

I would be less than frank, however, if I did not report we have been concerned, of late, at what appears to be a growing tendency of international organizations, including OECD, excellent as it is, to evolve from forums for discussion and information exchange to those of establishing controls and advancing supranational regulation without, in our opinion, adequate scientific basis.

Perhaps due to global economic recession, there also appears to be an overwhelming thrust of international bureaucracies to build "turf" across each other's boundaries.

A case in point might be the OECD's report of the director's workshop on selected environmental and resource issues. Global resources are the preoccupation of UNEP. Of course, the views of the 24 industrialized nations of OECD are essential to this debate. The Secretariat prepared a report based on experts who were unnamed; immediate publication was demanded.

Yet member governments were not at first given the opportunity to comment or discuss the reports in substance prior to its publication. Global issues are matters for serious concern. We, therefore, believed it essential to exchange views with other OECD members, prior to publication. In order to illustrate our concern, I would like to describe for you some of our specific objections:

First, the report contained serious technical inaccuracies which I will be glad to go into in some detail, if you wish, particularly acid precipitation, which has occupied EPA, particularly in our negotiations with the Canadians over the transboundary area pollution.

Second, the report concentrated chiefly on the need for increased multinational activity and planning by governments and international organizations, for example, OECD; it perforce overlooked the contributions we think that can be made by decentralized authorities at home and abroad, private institutions and free enterprise.

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[1] See appendix 13.

Third, the economic context for analyzing potential environmental problems and possible solutions we felt was not adequately addressed. This problem, coming from an organization whose very purpose is economic development, was troublesome. It failed to recognize sufficiently we thought the role that either technology or the marketplace can and should play in both anticipating and addressing environmental problems in an effective and efficient way.

Another basic objection to the report was that it presented an overly pessimistic view of the state of the world's environment from our point of view. It did not differentiate among the variety of problems in terms of potential urgency or seriousness, and overlooked the positive accomplishments that have already taken place at the national, regional, and local levels.

Solutions to environmental problems were viewed almost solely in terms of additional actions by Federal governments and international organizations. Our preference is to move toward greater decisionmaking by those individuals and entities most closely affected by the problems and the decisions.

We took steps to express our concerns. At this very moment—actually it's going to be tomorrow—the U.S. delegation is addressing the OECD Environment Committee on this subject in Paris. Thanks to our efforts, we know global issues head the agenda for discussion among the 24 nations. This exchange within the OECD on global environmental issues is important, it's essential—I have "important" here—but it's essential for preparation for the UNEP Session of Special Character, as well as to help us formulate and refine our own approach.

In conclusion, I would like to say that EPA intends to continue its meaningful participation in the activities of all appropriate bilateral and multilateral international organizations and to insure that the United States maintains its established leadership in protection and enhancement of the global environment.

In this effort, we will search for new ways of achieving our goals more scientifically and efficiently and, at the same time, maintain our commitment to international cooperation which is so important to the resolution of global environmental problems that affect us all.

Above all, and I feel this personally, we will seek cooperation, not the overwhelming confrontation I have certainly witnessed in my 9 months of expertise, among governments, international organizations, private industry, and environmental groups. To obtain and/or maintain clean air, clean water, and clean land deserves no less.

That concludes my prepared statement, Mr. Chairman.

I would be pleased to answer any questions you may have.

[Mr. Funkhouser's prepared statement follows:]

PREPARED STATEMENT OF RICHARD FUNKHOUSER, DIRECTOR, OFFICE OF INTERNATIONAL ACTIVITIES, U.S. ENVIRONMENTAL PROTECTION AGENCY

Mr. Chairman, I very much welcome the opportunity to be here today to participate in the Subcommittee's hearings on the status of the global environment. It is especially appropriate that global environmental issues are being examined here and now, since the 10th anniversary of the Stockholm Conference will be commemorated by the United Nations Environment Program's (UNEP) Session of Special Character (SOSC) to be held in Nairobi in May.

As you know, the basic mandate of the EPA is to protect the public health and welfare and the environment by serving as a domestic regulatory agency. In that capacity, the activities of EPA also have international implications and involvement. For that reason, EPA serves a necessary role in the formulation and implementation of U.S. policy on the global environment. I perceive this role to be an extension of and a complement to the State Department's development and coordination of foreign policy as it relates to environmental matters.

EPA accomplishes this goal by providing much of the technical and scientific expertise to carry out the United States' obligations in protecting the global environment. EPA scientists and technical experts attend international meetings and help to advance U.S. programs and policies. There are numerous activities related to information exchange and coordination of scientific research, both bilaterally and through international organizations. (I have attached to this statement a summary check-list of EPA's extensive international activities.) EPA personnel participate in international negotiations on transboundary and global environmental issues, such as: long-range transport of air pollution, ocean disposal of wastes, harmonization of chemical testing and chemical control programs. EPA also coordinates and implements the export and import-related policies and procedures under Resource Conservation and Recovery Act (RCRA), Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), and the Toxic Substances Control Act (TSCA).

EPA is the world's largest organization dedicated to the protection of the environment, and EPA works hard to fulfill its major responsibilities, predominately domestically, but also within the international community. In that respect, EPA reflects at home and abroad the general policies of this Administration, which are to decentralize to the extent feasible, to economize, and to utilize the private sector in addressing environmental problems. Greater efforts are being made and need to be made to integrate all public and private, domestic and foreign instrumentalities into activities to address and redress environmental problems.

International organizations play a key role in the advancement of understanding of global environmental problems. International cooperation is vital to the development of appropriate scientific research assessments and the responses necessary for the resolution of common environmental problems. However, it is our conviction that international cooperation need not always result in international controls or in commitments by national governments to international control strategies, particularly in advance of thorough scientific investigation. Appropriate coordination among governments is the most effective way to achieve maximum environmental benefits at the international level.

As previous witnesses have testified, the U.S. has been carrying out, through a high-level interagency Work Group on Global Issues, an examination of recent studies, including the Global 2000 Report, as part of a larger effort to establish U.S. priorities in global environmental affairs for the years ahead. Global 2000 and other reports have initiated an open exchange of perspectives and ideas among government agencies which has been particularly beneficial to development of U.S. policy. While the work of the Global Issues Work Group is still in an early stage, there are three areas of concern which will have priority focus:

- Strengthening the scientific analyses of environmental trends and problems as basis for improved policy-making. The need for improved environmental forecasting became clear through deficiencies of the Global 2000 Report, since many of its conclusions have been justifiably challenged by scientists on both scientific and analytical grounds.

- Greater involvement of private sector institutions, including business and industry, in environmental protection programs at national and international levels. We believe the principle of self-adjusting market mechanisms can be appropriate for many environmental problems; the need for private sector initiatives for the resolution of environmental problems should not be underestimated.

- Improved coordination and greater efficiency within international organizations, particularly in view of budget constraints and potential for program duplications. For example, the U.S. is working within international organizations to decrease duplication and increase specialization. Belt-tightening at home and abroad go together, particularly since the U.S. Government is the largest contributor in all international organizations. In this connection, I am attaching a list of the exceptional number of international activities of EPA in one field alone, acid precipitation.

International cooperation is an essential component to the resolution of global environmental problems, and we believe the three priorities outlined above will serve as a strong basis of achieving our goals. They will be a part of a set of environmental principles now being formulated by the Global Issues Work Group.

With regard to the Third World, we believe that sound environmental policies can benefit rich and poor nations alike. We do not believe that industrial progress and economic development need be antithetical to environmental protection. A paper prepared on the state of the environment by UNEP reaffirms what the United States has long believed, that economic growth and an enhanced global environment are inextricably linked. The U.S. is committed to the premise that the free market approach can play a constructive role in the protection of the environment, although it may need to be accompanied by complementary government action. Technological innovation and economic incentivies are the foundation for the resolution of future environmental problems which so often involve difficult economic development choices. There must be more optimism and credence given to the roles and contributions of science, technology and human ingenuity in addressing environmental and resource problems. This is reflected by the fact that although industralized countries may contribute to environmental problems, they also provide technology which has improved the environmental health and welfare of the lesser developed world.

Due respect should be given to different approaches various nations may adopt to integrate environmental considerations into development strategies based on their particular national values and priorities. International organizations can play a useful role in helping achieve this end, for example, through assistance in environmental monitoring and assessment, information dissemination to governments and environmental education and training.

The activities of the Organization for Economic Cooperation and Development (OECD) in addressing and assessing these global environmental problems are of primary importance. The OECD has made significant contributions to increased international awareness of past and potential environmental problems and has served as a most useful forum to exchange information and views on policy aspects of international environmental issues.

We have been concerned, of late, at what appears to be a growing tendency of international organisations, including OECD, to evolve from forums for discussion and information exchange to one of establishing controls and advancing supranational regulation without scientific basis. Perhaps due to global economic recession, there also appears to be an overwhelming thrust of international bureaucracies to build "turf" across each other boundaries. A case in point might be the OECD's Report of the Director's Workshop on Selected Environmental and Resource Issues. Global Resources are the preoccupation of UNEP. Of course, the views of the 24 industrialised nations of OECD are essential to this debate. The

Secretariat prepared a report based on "experts" who were unnamed; immediate publication was demanded. Yet member governments were not at first given the opportunity to comment or discuss the reports in substance prior to its publication. Global issues are matters for serious concern. We therefore believed it essential to exchange views with other OECD members, prior to publication. In order to illustrate our concern, I would like to describe for you some of our specific objections.

First, the Report contained serious technical inaccuracies, for example, concerning acid precipitation. I will be glad to give the Committee full details. Secondly, the report concentrated chiefly on the need for increased multinational activity and planning by governments and international organizations, i.e., OECD; it perforce overlooked the contributions that can be made by decentralized authorities, private institutions and free enterprise. Thirdly, the economic context for analyzing potential environmental problems and possible solutions was not adequately addressed. This problem, coming from an organization whose very purpose is economic development, was troublesome. It failed to recognize sufficiently the role that either technology or the marketplace can and should play in both anticipating and addressing environmental problems in an effective and efficient manner.

Another basic objection to the Report was that it presented an overly pessimistic view of the state of the world's environment. It did not differentiate among the variety of problems in terms of potential urgency or seriousness, and overlooked the positive accomplishments that have already taken place at the national, regional and local levels.

Solutions to environmental problems were viewed almost solely in terms of additional actions by federal governments and international organizations. Our preference is to move toward greater decision-making by those individuals and entities most closely affected by the problems and the decisions.

We took steps to express our concerns. At this very moment, the U.S. delegation is addressing the OECD Environment Committee on this subject in Paris. Thanks to our efforts, global issues head the agenda for discussion among the 24 nations. This exchange within the OECD on global environmental issues is important for preparation for the UNEP Session of Special Character, as well as to help us formulate and refine our own approach.

In conclusion, I would like to say that EPA intends to continue its meaningful participation in the activities of all appropriate bilateral and multilateral international organizations and to ensure that the U.S. maintains its established leadership in protection and enhancement of the global environment. In this effort, we will search for new ways of achieving our goals more scientifically and efficiently and at the same time, maintain our commitment to international cooperation which is so important to the resolution of global environmental problems that affect us all.

Above all, we will seek cooperation, not confrontation, among governments, international organizations, private industry and environmental groups. To obtain and/or maintain clean air, clean water and clean land deserves no less.

That concludes my prepared statement, Mr. Chairman. I would be pleased to answer any questions you may have.

INTERNATIONAL ACTIVITIES OF THE ENVIRONMENTAL PROTECTION AGENCY

BILATERAL

CANADA

a. U.S.-Canada MOI on Transboundary Air Pollution
b. U.S. - Canada International Joint Commission (IJC)

MEXICO

a. International Boundary Water Treaty
b. EPA - SMA MOU on Border Environmental Problems

GERMANY

a. Government-to-Government Agreement on Cooperation in Environmental Affairs
b. MOU on Research and Technology for Energy Systems

NETHERLANDS

a. MOU between EPA and Netherlands Ministry of Public Health and Environment for Cooperation in Environmental Affairs

JAPAN

a. Government-to-Government Agreement on Environmental Cooperation
b. U.S. - Japan Science and Technology Agreement

NIGERIA

a. U.S. - Nigeria MOU on Environmental Cooperation

USSR

a. Executive Agreement on Cooperation in the Field of Environmental Protection

PRC

a. Protocol to Executive Agreement for Scientific and Technical Cooperation in the Field of Environmental Protection

SCIENTIFIC ACTIVITIES OVERSEAS (SAO)

a. Yugoslavia
b. India
c. Poland
d. Egypt

MULTILATERAL

ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT (OECD)

- a. OECD Environment Committee
  - 1. Air Management Policy Group
  - 2. Chemicals Group
  - 3. Economic Experts Group
  - 4. Energy and Environment Group
  - 5. Transportation Group
  - 6. Waste Management Policy Group
- b. OECD Management Committee
  - 1. Part II Chemicals Program
- c. OECD International Energy Agency
  - 1. Coal Combustion Project
- d. OECD Nuclear Energy Agency
  - 1. Radioactive Waste Management Project
  - 2. Sea Dumping of Radioactive Waste Program

UNITED NATIONS ENVIRONMENT PROGRAM (UNEP)

- a. International Register of Potentially Toxic Chemicals (IRPTC)
- b. Global Environmental Monitoring Systems (GEMS)
- c. INFOTERRA
- d. Working Group on Guidelines for Control of Toxic and other Chemical Wastes
- e. Coordinating Committee on the Ozone Layer (CCOL)
- f. Industry and Environment Program

OTHER UNITED NATIONS

WORLD METEOROLOGICAL ORGANIZATION (WMO)

- a. Collaborating Center on Background Air Pollution

CODEX ALIMENTARIUS (FOOD AND AGRICULTURE ORGANIZATION)

- a. Committee on Pesticide Residues

WORLD HEALTH ORGANIZATION

a. EPA/WHO Collaborating Center for Environmental Pollution Control
b. EPA - WHO MOU on International Program on Chemical Safety

PAN AMERICAN HEALTH ORGANIZATION

a. EPA - PAHO Information Exchange

ECONOMIC COMMISSION FOR EUROPE (ECE)

a. ECE Senior Advisors on Environmental Problems (SAEP)
b. Convention on Long-Range Transboundary Air Pollution
c. Working Party on Low and Non-Waste Technology
d. Working Group on SOx Effects

EUROPEAN ECONOMIC COMMISSION

a. Annual policy level consultations to review major environmental issues

NATO/COMMITTEE ON THE CHALLENGES OF MODERN SOCIETY (CCMS)

a. Pilot Studies on: Drinking water, air pollution control strategies, estuarine systems management, disposal of municipal sludge, contaminated land.
b. Major pilot study completed in fall of 1981 on management of hazardous waste.

OCEANS

a. Law of the Sea
b. London Dumping Convention
c. Antarctic Treaty

Mr. **Bonker**. Thank you, Mr. Funkhouser.

I have several questions I would like to present.

First I would like to get your impression of EPA's legislative mandate for policy formulation on international environmental issues.

Mr. **Funkhouser**. I did a little research on that over the last hour, and I would refer the committee, Mr. Chairman, to the original 1969 NEPA (National Environmental Policy Act), and in that I would think we would use paragraph F under section 102, and I can give this to the staff, which we think probably gives us the clearest mandate.

That is:

> All agencies of the Federal Government shall recognize the worldwide and long-range character of environmental problems.

That includes EPA particularly:

> And where consistent with foreign policy of the United States lend appropriate support (in EPA) to initiatives, resolutions, and programs designed to maximize international cooperation in anticipation and in preventing a decline in the quality of mankind's environment.

That is a pretty good mandate and ties EPA pretty directly, I think, into this; it gives us our legislative mandate.

However, I can also cite, I don't know whether I can find it here, but I can cite most of the acts which we are involved in. Whether it's the Clean Air Act or the Clean Water Act or the London Dumping Convention, we are in there.

"The Administrator," meaning the administrator at the Environmental Protection Agency, appears under definition section 3 of the Ocean Dumping. We come to the Clean Water Act, page 2:

> It is further the policy of Congress, the President, that such national, international organizations as he determines appropriate shall take action as may be necessary to ensure that to the fullest extent possible all foreign countries take meaningful action for prevention, reduction, elimination of pollution in their waters.

It goes on:

> Except as otherwise expressly provided in this Act, the administrator of the Environmental Protection Agency, herein called administrator, shall administer this Act.

I conclude that in virtually all of the six, seven, eight major legislative acts, we are in there, largely due to the fact that it is the scientific and technical expertise of the U.S. Government that rests with EPA.

Mr. **Bonker**. The scientific and technical, does that extend to policy formulation then?

Mr. **Funkhouser**. It extends to policy formulation since under NEPA the words include that, I believe.

Mr. **Bonker**. EPA is required to be a part of the administration's process for the formulation of policy and U.S. positions on global environmental issues?

Mr. **Funkhouser**. Yes, sir.

Mr. **Bonker**. How would you characterize then the Department's working relationship with other departments, with State, with CEQ, with AID, on environmental problems of an international nature?

Mr. **Funkhouser.** I would characterize them as the closest possible relationship, both in the professional and the policy fields and in the individual relationships at the top, at the middle, at the bottom. We find ourselves not only being requested by AID, for example, to support their programs and policies overseas by supplying technical experts, but in any such problem as global issues, to be specific, the OECD Report, we are all in it together.

State, CEQ, of course, have even a broader keyboard than EPA does on the total spectrum of environmental problems. We in EPA are not, to my knowledge, at least it never crossed my desk, been involved in wildlife. We are not concerned or have a particular responsibility for whales, Law of the Sea, although we do get involved in ocean dumping.

We are not primarily concerned with North-South issues, the political issues involved in global decisions, but on that OECD report or on the statements that are going to be made at Nairobi, State and CEQ have the lead. They have been assigned responsibility by the White House to provide the guidance for the Nairobi Conference in cooperation with agencies such as EPA and the National Security Council and the Office of Management and Budget.

Mr. **Bonker.** If you have a policy difference with the other agencies, do you object?

Mr. **Funkhouser.** Yes; yes, we do.

Mr. **Bonker.** Do you see yourself as advocate for global environmental issues? It says here on page 2 that "EPA is the world's largest organization dedicated to the protection of the environment, and EPA works hard to fulfill its major responsibilities within the international community."

Do you really see under this administration the agency working hard to fulfill its major responsibilities to protect the environment?

Mr. **Funkhouser.** Yes, sir. We certainly are, in every possible way. In the OECD Global Issues we wanted to make it a better report. We, as I say in my report, in my statement, we thought the OECD was doing itself a disservice. Even I, and I am a generalist, I have been a diplomat for generations, and I am not a scientific expert on the environment, but even I could see the technical inaccuracies of the chapter on acid precipitation.

And what we did, we asked the OECD Secretary if we and other countries could take a look at the report in substance and perhaps make it better. And I think we did. They accepted most of our technical and other recommendations and put out a report which we feel is much stronger, and I would say defends not only the United States' point of view internationally but I think it makes a much better document, which is going to be tabled at Nairobi.

I think this is an illustration of what we think we are doing.

Mr. **Bonker.** Take the report, for example, of the OECD. It's been widely reported in the press that the U.S. Government has held up the OECD report on the global environment. All of the other Federal agencies signed off on the report except EPA. Here, in the New York Times, it says, quoting administration officials:

"The report prepared by the Secretary of OECD is being strongly challenged by the U.S. Environmental Protection Agency on political, factual, and procedural grounds, despite the fact that other

Federal agencies" and it goes on to mention them, "have found the report acceptable."

What political grounds, if that is a valid assumption, were used to challenge this report?

Mr. FUNKHOUSER. I have to correct the record; Mr. Shabecoff spoke to me.

I know he is here today, and I understand that—this is not out of school, I suppose—he expressed his disappointment that the full article had not been published in the New York Times, which I think would put that article in much better context, hopefully.

This is inaccurate to state that EPA was alone in objecting to this report. On the contrary, sir; it was unanimous in that both State Department and the CEQ and the EPA, the Department of Energy and the National Oceanic and Atmospheric Administration, anyone who looked at that report, whether a technical agency or whether a political agency, such as the State Department, we were in unison, sir, on pointing out to the Secretariat that this report had, (a) too many technical inaccuracies to see the light of day if it were to be a serious report; and (b), that it was scientifically superficial and, (c), in the philosophy I guess which Mr. Shabecoff referred to "politically;" it was controversial, anything involving the State Department, and anything involving this administration I suppose has a political aspect, so he is correct in that.

Mr. BONKER. Let me quote from your memo then instead of the New York Times.

On page 3 of this draft memo from you to——

Mr. FUNKHOUSER. I am sorry; what are you reading from?

Mr. BONKER. This is a draft reply to Paris: "OECD Globaloney." Is that a phrase you have worked up? I am not familiar with it?

Mr. FUNKHOUSER. Page 3; I surely couldn't have used that?

Mr. BONKER. Draft reply to Paris on "OECD Globaloney." Can you describe to the subcommittee what that word represents?

Mr. FUNKHOUSER. I don't believe that that appears in the draft telegram?

Mr. BONKER. I am referring to this draft cable from you to the OECD Director.

Mr. FUNKHOUSER. A draft, sir, a draft?

Mr. BONKER. Yes.

Mr. FUNKHOUSER. I believe that if the word "globaloney" were used, the only time I recall using it was a direct quotation of Herman Kahn.

Mr. BONKER. Do we have a copy of this?

Mr. FUNKHOUSER. I believe that the source of the word "globaloney" was Herman Kahn's. I don't claim any original thoughts.

Mr. BONKER. I wondered if you had any interpretation of it.

Let's move onto something else.

Anyway, on page 3 of the draft cable you said that "the report repeats the environmental cliches, generalities and superficialities of earlier gloom and doom publications which currently are under scientific challenge, 'Global 2000'."

Obviously you felt the report was pretty superficial when almost everybody else in testimony before this subcommittee felt it was a pretty substantive document.

Do you want to expand on the superficiality of that report?

Mr. FUNKHOUSER. I would. I welcome it. But I looked at the testimony of Mr. Hill and Mr. Buckley. If they considered the original report, not the final report which was improved, an adequate, excellent, document, I would be surprised. Maybe I didn't read the testimony adequately, but, having not discussed it with Buckley, but, having discussed it with Jim Malone and having discussed it with Harry Marshall and having discussed it with Charles Horner and Al Hill, I assure you if anyone in EPA had a view different than those gentlemen, I don't seriously know what it was, sir.

We agreed that the original report was inadequate. We agreed that the original report was scientifically weak. And we wanted to do the best we could to make it a strong report.

Mr. BONKER. Let's proceed on that basis. When you say inadequate, do you mean it was not strong enough on environmental concerns or inadequate in what context?

Mr. FUNKHOUSER. May I be specific? We did provide Carole with a copy of our severe criticism of the acid precipitation chapter. I would like to bring to your attention what we considered superficial, inadequate science.

We took the bulk of our comments not from EPA but from Dr. Alvin Trivelpiece, Director of the Office of Energy Research, at DOE, and I believe you have his criticism, which he did in two ways. One was to take all of the comments that we in EPA had made in ink to the chapter, and it looks like a D student's effort in school. I would hate to get anything like that back from the professor.

But then he also went through paragraph by paragraph the shortcomings of the OECD paper and they are very serious, as you will see. I can go through it paragraph by paragraph, but——

Mr. BONKER. So when you refer to the acid rain section in the report, it is not necessarily that it was not strong enough; it was improper scientifically.

Mr. FUNKHOUSER. Yes, sir; it does not matter whether it's strong or weak; it was a matter of whether it was accurate or inaccurate. This section of the report just doesn't hold water.

Mr. BONKER. What about other areas of the report?

Mr. FUNKHOUSER. I would be most happy to give you our corrections of the chapter on CO_2 and the climate, our corrections on the chapter on ozone, our corrections on the chapter on chemicals, our corrections on the chapter on hazardous wastes.

Mr. BONKER. It seems to me the other agencies allegedly signed off earlier, but your point is that they didn't, we had earlier testimony that they had.

Mr. FUNKHOUSER. No, sir; I don't understand the misunderstanding, because this is not EPA acting alone. What we did, we asked if we could have time to make corrections in the report. The OECD can publish anything they want. The Secretariat does not have to get approval of the context. But we asked if we could correct it, and over the Christmas vacation we sent out the chapters of the report to all of the intelligent people in town, we thought.

Their comments all came back to both the State Department and into my office as Director of International Activities. If there is one thing I have learned how to do, I think, over 100 years of State Department work is to be a "city editor" and, without any pride in authorship, to pull all of the comments together.

The comments that were pulled together in the first draft, and then that was farmed out to State and CEQ for their comment, and I assure you—not a word was changed I was about to say. Of course, a word was changed. It didn't go out. My first draft did not go out. But the final draft which was drafted by me and Sue Patterson of the State Department did go out. It was much more succinct and it was signed off on by Al Hill, signed off on by Jim Malone, I guess it was Harry Marshall, the top people in the State Department.

In fact, we had discussions with Walter Stoessel, who used to be my boss in Moscow, and I assure you that this was not an isolation of EPA but rather a deference insofar as who is going to put it all together. The net result was a combined telegram by EPA and State which was better than either of the first drafts, which lacked a lot, frankly.

Mr. **Bonker**. Well, we could go over and over this. It seems to me that if your basic concerns were technical and scientific, certainly it gives the impression in your draft memo that it's more of a political and policy nature.

When you make a statement like, "Global 2000 is antithetical to certain basic U.S. environmental positions and policies," for example, "evangelism before realism," it really hints more at policy and political considerations than technical and scientific.

Mr. **Funkhouser**. Yes, sir. We tried to make it a comprehensive report based on all of the comments received from all of the agencies of Government who were responsible. EPA took, I would say, the lead when it came to the criticism of the technical chapters, but when it came to the philosophy, this is a political matter, this is a Government-wide effort.

I don't mean to indicate in any way that the Environmental Protection Agency doesn't have political views. When it comes to the environment, we do. We have political views and we try to, I think, apply them equally consistently domestically and internationally.

Mr. **Bonker**. I assume when you talk about political views—you made several references to decentralized efforts—that you oppose centralized organization for global environmental protection. You referred to private sector and industry contributions and the like. Maybe we could explore that for a moment. Because that was referenced in another cable from the State Department to OECD, which stated:

> Private sector initiatives and the free market approach can play a constructive role in the protection of the environment.

You made similar references in your statement. Can you provide for the subcommittee some specific cases where the private sector and the free market have played a constructive role in the protection of the global environment? I mean if the administration's view is that it ought not to be necessarily a Government policy or Government thrust but ought to be out there in the private sector and in industry, could you share with the subcommittee informally some good examples or specific cases where this has occurred?

Mr. **Funkhouser**. Yes; I will try.

When we speak of an increased role of the private sector, even in our wildest dreams we would not suggest there is no role for Government. This is a matter of everything is relative. We feel a greater role could be played by industry and the private sector and by the private sector we mean private science, we mean private initiative, we mean human intelligence, we mean——

Mr. **Bonker**. I am looking for a specific example. You made a statement earlier that OECD overlooked the contributions by the private sector and industry.

Mr. **Funkhouser**. Yes, sir.

Mr. **Bonker**. Overlooked what contributions? A few specific cases would help with the subcommittee's understanding of your philosophy on this matter.

Mr. **Funkhouser**. Insofar as examples where the private sector and free market mechanisms have played a significant role, I would start with first the broadest possible approach. The best way to clean up, the way to help human health and welfare, I suppose, is to keep people alive and eating.

I would submit that, let's take the chemical industry, if we did not have the free market chemical industry we wouldn't have pesticides, we wouldn't have as much food.

If you take the oil industry, I would say that one of the greatest, one of the greatest improvements in the environment that has ever come to my attention is the replacement, due to the market mechanism, of coal, which is pretty dirty.

I lived 7 years in Scotland before I came back to Washington, and they used to call Edinburgh "Old Reekie." Old Reekie was called Old Reekie because of the fog plus the coal burning. Now because of the market mechanism we started burning, the British started burning oil, particularly after they found oil in the North Sea.

I would say the market mechanism which made oil cheaper as a fuel than coal is a self-adjusting mechanism which was brought about by the law of supply and demand and by private industry. Now, if you go to London or if you go to Edinburgh I can assure you it's the best and cleanest air you will ever see in your life, and very little coal is being burned. That to me is a pretty broad brush treatment of the question.

Mr. **Bonker**. So you think that is pretty much the scope or extent of the industry contribution to global environmental protection. How about the question of tropical deforestation?

Mr. **Funkhouser**. You have got me in a very weak spot on tropical deforestation. This has not come across my "in" box in EPA since I have been there.

Mr. **Bonker**. You made references several times to acid precipitation. What is industry doing to contribute toward minimizing environmental problems of acid rain?

Mr. **Funkhouser**. I am on safer ground there, Mr. Chairman. I would say that since we have invested probably $4 billion into scrubbers for coal-fired utility plants and boilers, I would say that the private industry is making a potful out of environmental protection mechanisms.

I would say that the marketplace has come up with real aids to the environment because of demand.

Mr. **Bonker**. Do our Canadian colleagues feel the same way?

Mr. **Funkhouser**. They have not yet put one scrubber in. They would be happy to have us put more scrubbers in at another $4 billion, but they have yet to put their first in. I wish they would. No, I think that is a fair example of industry, private industry responding to the demand of the marketplace.

Mr. **Bonker**. Mr. Pritchard.

Mr. **Pritchard**. I don't know if I will get into this area. I don't think we can have any progress in these areas without industry making adjustments and sometimes they do it because they are pushed a little. Sometimes they do it because it's in their best interests. It's hard to separate those things out, whether they are responding to the market or responding to need. But they have to be part of the solution or the solution is not reached.

But I must say that I also feel that way about the Canadians. They are complaining as if all of the problem is ours, and they are doing darn little themselves in the area of environmental safeguards on the theory it's all coming from the United States.

I think probably we would be happy if Canada would abide by the same environmental standard that we do. I think if we could get the parity, I think then their unhappiness would be received in a little better light. But so far as I can see, they want it both ways. They don't want to do much on their plants, but they are very unhappy with ours. And they have legitimate concern.

So I will send it back to you, Mr. Chairman.

Mr. **Funkhouser**. We originally, on orders of Congress, entered into negotiations with the Canadians to do exactly what you have suggested, Mr. Pritchard, and that is to try to get them to come up to our standards. Our standards are the toughest in the world. We are light years ahead I believe of most other countries in the world, if not all of them in most things that we do for the environment. And insofar as Canada is concerned, we go round on this daily. But the fact remains they don't begin to match our standards, whether it's emissions from automobiles, whether it's scrubbers.

Mr. **Pritchard**. I know that.

Mr. **Funkhouser**. And we would like to see exactly that attitude taken by our brothers across the boundary.

Mr. **Bonker**. Of course, we are going to take up the Clean Air Act shortly, and it will probably be a relaxation of those standards. I assume that will be EPA's position. So, you can laud past efforts but it looks like there is little desire to continue those high standards.

Mr. **Pritchard**. Mr. Chairman, I do think that you are a dear friend of mine, but I think that that is a broad statement that can't be supported, that we are going back on air standards. That is a decision that Congress is going to make.

Mr. **Bonker**. Well, the Congress is going to make the decision ultimately, of course. But the administration will undoubtedly have a position on that.

Mr. **Pritchard**. I don't think they are going to throw out all of the standards.

Mr. **Bonker**. I didn't say that. I said a relaxation of the standards.

Mr. **Pritchard**. I think we would have to look at it.

Mr. BONKER. What will be the administration's position on the Clean Air Act as it relates to acid precipitation and standards presently employed by U.S. industry?

Mr. FUNKHOUSER. I can only speak basically to the way it affects our Canadian negotiations. I am not an expert on the Clean Air Act. My problem with the Clean Air Act, as a newcomer, is my shock at, in spite of being a graduate of a good university in science, Phi Beta Kappa, Summa Cum Laude, I can't begin to understand that act; I can't understand it. I have tried. I have given up.

But when it comes to the Canadian negotiations, which is my bag, we are already spending in the U.S. economy something like $15 billion, $16 billion a year to clean up the environment. Any relaxation would be only that we want to clean up the act so we can clean up the air. And we would like to negotiate with the Canadians to do half as much as we are doing.

I am confident that our posture on the Clean Air Act is to do better rather than do less.

Mr. BONKER. To do better?

Mr. FUNKHOUSER. To do better rather than less.

Mr. BONKER. We were discussing briefly and I was still looking for some examples on free market forces at work in protecting the environment. What about the risk that is posed to developing countries by the export of hazardous substances? Is that going to be an issue, do you think, in the coming decades?

Mr. FUNKHOUSER. For industry this is a serious matter, and industry takes a responsible view toward this program. I have in my hand, as the phrase goes, the statement by the Business and Industry Advisory Committee to OECD. OECD has as one of its key appendages a business and advisory committee and they have put into print, which I would like to table, their responsibilities as they see it for their share of safeguarding underdeveloped countries from the export of chemicals.

I will just quote one sentence. This is what they are putting in print as the responsibilities of the chemical industry; they are tabling this at the next session of OECD:

> A manufacturer must take reasonable steps to evaluate his products with regard to hazards to human health and the environment, and must do so irrespective of the country to which the products are to be supplied. In this respect, industry must not differentiate between chemicals that are marketed in the country of manufacture or exported.
>
> The information gained must be communicated to all customers whenever possible.
>
> Industry recognizes and accepts these obligations. It is however important that governments accept and recognize their own obligations.

I only table this as an indication that business and industry does have its moral purpose, and realizes that they must take measures to safeguard health.

Mr. BONKER. You are referring to the OECD expert group?

Mr. FUNKHOUSER. Yes, sir.

Mr. BONKER. It's my understanding, and I think you point out, that the chemical industry panel undertook this study. The U.S. industry representatives approved the report. What is the EPA position or recommendation on this part of the report, now that the industry has more or less signed off on it as it relates to export notices on banned chemicals?

Mr. FUNKHOUSER. I don't think I can answer that offhand. I will have to supply that to the subcommittee, if I may.[1]

Mr. PRITCHARD. May I ask a question?

Mr. BONKER. Certainly.

Mr. PRITCHARD. It seems to me that we don't want to get too virtuous about industry and what they want to sell overseas. They want to sell everything they can overseas. The problem, of course, comes when the country itself allows anything to come in, and then you get in the spot if you don't sell it, somebody else will. That argument, you know, if we don't, why the French will or somebody else will.

So what is our responsibility? The developing countries should agree on a standard, or what really should happen is the country itself should set the standards rather than us trying to set the standards for some other country. It's sort of an impossible situation if you get into it.

Mr. FUNKHOUSER. The chemicals program under OECD is perhaps their finest, and I would say insofar as industry is concerned, in my limited experience, I know of no industry that takes a more active part in the OECD negotiations, whether it's guidelines, whether it's information, whether we send representatives of the environmental groups and industry to these meetings in Paris of the OECD. I know of no greater area of intelligent cooperation than in the chemicals field.

Mr. PRITCHARD. Then do the chemical countries abide by these standards that they set down?

Mr. FUNKHOUSER. That is a problem. We are in the throes right now of a serious difference of opinion between the United States and the Common Market countries over MPD, minimum premarking data. The Common Market has just come up with their own rules and they don't conform with our law, TSCA law.

We feel, I am told by the Chemical Association and by our experts in Government, that the United States is, in its law, which has been implemented under TSCA for 3 or 4 years, far in front of the chemical industry on the continent. We are being pressured by the Europeans, the Common Market countries, to modify our legislation to conform with what they are trying to do.

As I understand it, we would prefer to see them follow their own rules which were just installed and see how they work before we are prepared to change the regulations under which we have been operating reasonably successfully. Insofar as Congress and insofar as the executive branch and insofar as the industry is concerned, our law has worked. We have not been able to get together on that specific issue.

Mr. PRITCHARD. I guess I was thinking more of——

Mr. FUNKHOUSER. Maybe I got off the track.

Mr. BONKER. Both. Do the chemical companies in the European Community countries really follow their standards? It does not do much good to have these standards if foreign companies don't abide by them.

Mr. FUNKHOUSER. I really can't answer that question to your satisfaction.

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[1] See appendix 12.

Can you help me?

Ms. **Grieder**. I think it might be too early to tell.

Mr. **Pritchard**. That is the whole thing; the standards. But if we don't abide, it doesn't make much difference.

Ms. **Grieder**. We have had a limited experience with the standard as well as notification process.

Mr. **Bonker**. But the idea is if you have standards or guidelines or procedures, even if they are voluntary, and they almost have to be, it's hard to have an international mechanism for enforcement on something like this, but at least the recipient country has an opportunity to get this information, to make decisions on whether or not it wants that hazardous waste or chemicals in the country.

If certain companies don't want to post that information, then the country has an option.

Ms. **Grieder**. That's right.

Mr. **Bonker**. But the whole idea is to develop some kind of informational source so that the countries which lack maybe the technical and scientific sophistication to make judgments on what kind of stuff is coming in, at least will have information. If the country wants to post it, fine. The companies that don't may lose some business.

Mr. **Funkhouser**. Mr. Chairman, we have been doing this. Export notifications cross my desk every day. No other country in the world can approach us on our notifications, I think I am right on that, our notification to Nigeria or any other country; we are way ahead of the field on it.

It's a matter, as with acid precipitation, of encouraging others to come up to our standards.

Mr. **Bonker**. One last question, Mr. Funkhouser. That concerns the Global 2000 Report. The Report was released a few years ago and this subcommittee and others held hearings on the report. There seemed to be a great deal of acceptance in the environmental community of the findings and of some of the recommendations of the Global 2000. Your statement here is that it's antithetical to certain basic Government environmental positions and policies. I understand that EPA is currently negotiating a contract with Herman Kahn and Julian Simon to prepare a critique of the Global 2000 Report for the Global Issues Work Group.

We all know that both of these individuals have already done extremely critical reports on Global 2000. Are you looking for some kind of analysis, some kind of objective critique, or are you going to those people because you realize that maybe they have positions that are more in line with yours?

Why even have a critique of Global 2000 now? It seems to me that too often our Government goes in one direction in attempting to establish some concerns and goals and then a new administration comes in and we put everything in reverse and go back in the other direction. That applies to domestic as well as foreign policy, and all administrations are equally guilty.

But we lack a certain continuity and credibility. If one administration is going to be so proenvironment as to greatly inflate the concerns and another comes and is so antienvironment that it greatly deflates the concerns, we are going to leave everybody confused. I am not sure we are being very responsible in dealing with some of these real problems of the world.

Mr. **Funkhouser.** I will try to answer that insofar as our operations in EPA are concerned.

We are not the lead agency on this review. It is CEQ and State. This is not to avoid responsibility because we do play a role in the task force that is formed to study these problems.

I know personally of no contract that these two gentlemen have been asked to work on. I would welcome it. I would welcome more brains of any particular coloration focusing on this problem. It is worth the most we can get.

Our basic objection I suppose to Global 2000, I agree with what you say where the one administration seems to support such a report enthusiastically and ours does not. We don't question the usefulness of Global 2000. It woke everybody up. It was "doom and gloom" and there is nothing to wake people up so much as "doom and gloom."

We, however, feel, as I think you in Congress must feel, that this is not the last word. There are mistakes made. The authors of the report say that their modeling was primitive. The models themselves are greatly sophisticated now, more sophisticated. They seem to improve in a geometrical progression. We know a lot more. We may or may not be running out of some of these resources.

We thought we were running out of oil. I was born in 1917 and I don't remember it exactly but in 1918 the U.S. Government issued a statement that we are running out of oil. After World War II the same thing happened. The same for coal in Britain. They thought they were running out 100 years ago. As a result of private enterprise, there are more coal and oil reserves than then.

What I am trying to say is that the Global 2000 is an excellent, I hesitate to use "excellent", it's a challenging think piece that is fundamental to the study of where we go in the next decade. But you certainly want us to take step 2, and that is what we are trying to do. I don't know whether it's Herman Kahn or who it is doing it but more power to them.

Mr. **Bonker.** If there is an attempt to undermine step 1, you will never get to step 2.

Mr. **Funkhouser.** I agree, but let's go to steps 2, 3, and 4.

Mr. **Bonker.** Thank you very much, Mr. Funkhouser, for being here today. We appreciate your testimony.

Mr. **Funkhouser.** Thank you.

Mr. **Bonker.** We now have a panel of four that we would like to call to the witness table.

They are Erik Eckholm, International Institute for Environment and Development; Nicholas A. Robinson, professor of law, Pace University, and member, board of directors, Sierra Club; Thomas Stoel, president, Global Tomorrow Coalition; and Robert Stein, president, Environmental Mediation International.

We have four distinguished witnesses and some heavy testimony. If we go through it word by word we will be here until maybe 6 o'clock. The chairman has other commitments. I would like to ask you—and I think the witnesses have already been forewarned—to summarize your statements in about 5 to 7 minutes.

I think what is really important is that we develop a body of information through these hearings which will be very important for future consideration by the Congress and others on global environmental issues. The work that has gone into the testimony is important and will be a valuable contribution to the subcommittee's published report.

For our purposes of today, if you would summarize your remarks to allow us some time for questions. You may want to comment on things that have come to mind in the last hour or so.

I think first we will begin with Mr. Stein, because he may comment on an issue that comes close to home. When we take up something like Global 2000, we are way out of our constituency, so if we can do anything that is relevant, we are anxious to hear it.

So, Robert Stein, president, Environmental Mediation International, you may proceed.

STATEMENT OF ROBERT E. STEIN, PRESIDENT, ENVIRONMENTAL MEDIATION INTERNATIONAL

Mr. STEIN. Thank you, Mr. Chairman. I will try to summarize my testimony.

We are a nonprofit organization with offices in Canada and the United States that seeks to act as neutrals in the settlement of international and transnational environmental disputes.

Part of the testimony I would like to stress today is the part you referred to in your introductory remarks as looking to the future. And that is the whole issue of the way in which international and transnational environmental resource disputes are going to be resolved in the future.

It is my view that environmental disputes within countries and between them or affecting the commons are going to increase in the next 10 years. The whole development since the Stockholm Conference of Environmental Awareness has, I believe, seen some of the seeds of environmental disputes and environmental conflicts, and that is not really all bad.

The Stockholm Declaration, which is referred to in my statement, describes principles of responsibility and principles of liability, and because of these principles and others enacted by other organizations, there has been a new impetus to the raising of international environmental issues by those adversely affected or those who potentially could be adversely affected by activities that originate in another state or another country.

And, because the principles have been asserted and because they have developed credibility through acceptance by the international community, these principles of responsibility and liability, raising these rights and asserting responsibility will inevitably give rise to disputes.

In the period ahead, with both increasing environmental awareness, with the real and perceived shortages of available resources, and the economic climate of the 1980's, I think it's apparent that a variety of conflicts between different legitimate interests will arise.

What does this mean really in 1982 for the 1980's. If one looks at the way in which environmental disputes are presently resolved, diplomatic negotiation is the principal means of resolution or settlement of environmental disputes. International agreements, a number of which were mentioned by Ambassador Funkhouser, have been concluded.

Most of them in the first instance provide for resolution of disputes by diplomatic negotiation and this is appropriate. Some provide for administrative arrangements. Some provide for resort to mediation or arbitration.

There are a number of international disputes settlement centers which have arisen whose works might touch on environmental disputes. The World Bank manages the Center for Settlement of Investment Disputes; the International Chamber of Commerce, a private organization based in Paris, deals with international disputes of a private contractual nature.

It is my thesis, one borne out I think by events to date and one which will continue, that the kinds of disputes that are going to arise will make some of the environmental issues to data really seem simple. What I am going to suggest and what I discuss in the last part of my testimony, which I request to be included in the record, will be a consideration of some of the means of settling environmental disputes and a look at the way in which they might be dealt with.

Negotiation is and probably will continue to be the principal means of settling international environmental disputes. Governments will be the principal negotiators. Sometimes they or the real parties interested need help because they are at an impasse, because all the parties are not adequately represented, or because there is too great a discrepancy in the power relationship between or among the parties.

In such circumstances, they may wish to seek a third party. If the negotiation is being carried out pursuant to an international agreement, recourse to a specific third party may be called for.

Third parties, it is my belief, can be brought in to use their own power and prestige—good offices or facilitation—can be asked to provide assistance and suggestions which to be accepted, must be agreed to by the parties'—use of mediation or conciliation—or may decide on a course of action which the parties agree in advance they will accept—binding arbitration or judicial settlement. Third parties, to be accepted, must be independent of the parties, although neutral is the phrase often used.

Each of these techniques can be used as provided in an international agreement or on an ad hoc basis. There are roles which can best be played by governments—good offices or mediation—by international organizations or agencies—all of them—or private parties—good offices, mediation or arbitration.

One of the specific examples I referred to in my testimony is the OECD, which uses itself as a forum to try and obtain agreements from members on procedures to harmonize the assessment of data for new chemicals. Outside of the environment area, I would comment the OECD has spawned dozens of international agreements so it is really much more than just a forum for discussion.

An organization such as the Organization of American States can provide service to its members in the assessment and settlement on environmental or natural resource issues. The International Joint Commission between Canada and the United States is now seized of such an issue which it said it will resolve next Monday, the 26th, dealing with the question of the Ross Dam between British Columbia and Seattle.

In that dispute, which I know you are quite familiar with, Seattle has sought to raise a dam that under an IJC order of 1942 it claims it has the right to raise. British Columbia, even though it signed a compensation agreement in 1967, now says that the dam should not be raised and alternatives should be found.

Both parties have negotiated seriously together for a number of years. They broke off last year and now have resumed.

Again, I think this case is an example of where a third party, without a direct interest, might be able to help the two parties involved in finding a solution to a particular problem.

Finally, I would just like to mention the area of putting dispute settlement clauses in international agreements. The Law of the Sea agreements, which involved an extremely complex and far-reaching set of negotiations, set up a separate committee early in the negotiations to develop appropriate dispute settlement clauses. These were agreed to despite the large number of states involved in the negotiation with diverse economic and cultural outlooks.

UNEP should give careful attention to the ways in which disputes arising under the regional seas program can be handled. So should Canada and the United States in negotiations on the long-range transport of air pollutants. The provisions of the dispute settlement and enforcement clauses should fit the agreement and the parties to it.

Having effective, well-thought-out clauses under consideration may give the negotiators confidence to accept provisions that they would not otherwise accept if their concerns would not be fairly and equitably dealt with in the event of dispute.

Mr. Chairman, this has been a very quick runthrough of some of the issues in international environmental resource disputes. I think some of the issues which have been raised by many others, and some were raised in my testimony, should begin a discussion of the subject of the settlement of international environmental disputes which may not have been appropriate in the first 10 years after the Stockholm Conference. But now to avoid the discussion, I believe, would be a mistake.

All groups, public and private international organizations, governments, nongovernmental organizations, and private persons must be tapped, and I hope as a result of these hearings, Mr. Chairman, the discussion will continue.

Thank you. I realize I just touched very briefly on Skagit, but I will be happy to answer any further questions.

[Mr. Stein's prepared statement follows:]

PREPARED STATEMENT OF ROBERT E. STEIN, PRESIDENT, ENVIRONMENTAL MEDIATION INTERNATIONAL

Mr. Chairman:

My name is Robert Stein and I am President of Environmental Mediation International, a non-profit organization with offices in Canada and the United States that seeks to act as neutrals in the settlement of international and transnational environmental disputes. Thank you for the opportunity to testify before the Subcommittee on the changes that have taken place in the ten years since the UN Conference on the Human Environment held in Stockholm in 1972.

This is the third day of hearings on this subject held by the Subcommittee. For me, that has both advantages and disadvantages. I have had the advantage of reading through the interesting testimony of a large number of expert witnesses from the legislative and executive branches of government as well as from the private sector including environmental and scientific organizations. The disadvantage is that it is harder to carve out something new and different.

Without trying to summarize all the papers in just a few sentences, there are several common themes in the earlier testimony: the tremendous growth in interest and concern for the environment; the development of national and international institutions to deal with the issues; the concern for environmental assessment; the wealth of additional understanding which has been developed as to the scientific underpinnings of the environmental problems; and finally the recognition that there is so much yet to be learned.

It is the purpose of my presentation, to comment on an aspect of these developments, since the Stockholm Conference.

My testimony this morning will focus on the question of the settlement of international environmental and resource disputes, and another theme bears on this issue: As we uncover more information, we not only identify solutions to some problems we know about, but also discover problems and interactions we did not even know existed.

It is my view that environmental disputes within countries and between them or affecting the commons will increase. For this reason there is a need in the period ahead to take a new look at the way in which countries, domestically and internationally, settle their environmental disputes. There is a need to develop new mechanisms to supplement existing methods which may more effectively deal with the problems that are faced. Before proceeding, it would be appropriate to describe what I mean by international environmental or resource disputes. An international dispute is one which the physical problem crosses a national boundary (e.g. an international river dispute), or exists in the commons (ocean pollution) or involves entities from more than one country (e.g. a trade dispute) or an international organization's activity within a country.

By environment and resource, I include pollution problems, and other changes to the physical environment and concerns over resource allocation or use. A dispute is a disagreement involving a specific issue over which a conflict in values is joined. The dispute must in some way be communicated to the other party.[1]

In a not too indirect way, the whole development since Stockholm of environmental awareness has sown the seeds of environmental disputes and environmental conflict. And, in my view this is not all bad.

The 1972 Declaration of the UN Conference on the Human Environment stated in Article 21 that:

> "States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or areas beyond the limits of national jurisdiction."

This statement has been echoed in a number of other developments as well, including the OECD principles on transfrontier pollution agreed to in 1974 and in a number of international agreements.

As stated by the representatives of a number of countries, the principles expressed in this Declaration were expository of existing international law.

These principles described the responsibilities of states and of entities within states (private organizations, constituent units of government) for preventing environmental harm where that effect is outside their territory. At the same time, it also created the right for many groups, individuals and governments alike, to assert the responsibility of states and others in instances in which they believed those entities were not living up to the responsibilities they had agreed to. The Stockholm Declaration gave new life and impetus to the raising of international environmental issues by those adversely affected, or those who potentially could be adversely affected by activities that originated in another state.

Because the principles have been asserted, and because they have developed credibility through acceptance by the international community in some of the declarations and agreements described above they have asserted rights which previously had not existed. Raising these rights and asserting responsibility will inevitably give rise to disputes. Contrast this with the situation before Stockholm. Just two years before, the U.S. established the Environmental Protection Agency, and the National Environmental Policy Act was passed calling for impact statements for projects having a significant effect on the environment. Few other countries had environmental ministries or departments. Now over one hundred governments have some form of environmental agencies. Couple these advances with the increasing environmental awareness in all parts of the world, both developing as well as developed, and importantly the real (and perceived) shortages of available resources, and the economic climate of the 1980's and it is more apparent that a variety of conflicts between different legitimate interests will arise. For some of these there is no easy means of solution. We have heard from Professor Gilbert White, in his prepared testimony, that some problems are getting worse while others are being dealt with effectively.[2]

What does this mean in 1982 and in the decades ahead? The area of water supply and water quality is one which is crucial to the survival of all. The U.S. government through the CEQ and Department of State publication "Global Future; Time to Act" (1981) which was a followup to the Global 2000 study, stated that:

"Water resources represent a great potential for conflict

> because of competing demands on limited supplies or because of deterioration in quality thru use. Conflicts exist both within national boundaries and between adjacent countries. The projections of Global 2000, suggest that such disputes will increase dramatically. Despite the potential for disputes, conflict resolution arrangements often do not exist in international treaties or are not adequately addressed."

As a recommendation, the report stated at page 125 that:

> "Because of the risk to peace, the United States should encourage other countries, and should itself, establish conflict resolution arrangements which can mitigate or help resolve future international water conflicts."

In the area of air pollution the lines have already been drawn. In Europe the UN's Economic Commission for Europe is attempting to reconcile approaches to long range transport of air pollution under a 1979 agreement concluded by ECE states.[3] In North America, Canada and the United States signed an Memorandum of Intent calling for the negotiation of an agreement on long range transport of air pollutants (called Acid Rain by some).[4] Canada believes that the scientific evidence is clear enough to begin to work out strategies for solution. The U.S. negotiators, while stating their commitment to the issue, have called for further research, and have devoted far more attention to the reauthorization of the U.S. Clean Air Act than to the bilateral discussions. In my view, the domestic and international issues should be considered together and not sequentially and separately.

Smaller site specific disputes between Canada, Mexico and the U.S. and in Western Europe exist and are not being settled. Earlier speakers addressed the much broader problem of increase in CO_2 which will still loom large when the long range transport issue is more under control.

Other conflicts are also possible. The allocation of fish stocks as a result of the new economic zones being worked out by the Law of the Sea Conference can give rise to disputes. Violence was not far from the surface in at least one of these disputes between Canada and the U.S. Passage of LNG tankers through sensitive ice covered waters may give rise to another dispute between Canada and Denmark. Disputes over off shore oil, a vital resource, have raised friction between China and Taiwan over the Paracel Islands, and China and Japan over the Senkaku Islands. This issue forms an aspect, though small, of the Falkland (Malvina) Islands dispute between Great Britain and Argentina. Export of hazardous substances, and international rules for testing of toxic chemicals also need working out.

The past ten years has seen the increasing use of environmental assessment which properly should be the first line of defense against environmental disputes getting out of hand. Environmental reviews can be carried out by a domestic agency within a country for activities that may have an environmental effect beyond the territory of that state. The United States is now doing this, as are other countries in their bilateral aid programs.[5]

A number of multilateral agencies also conduct environmental reviews of their projects.[6] On February 1, 1980, a number of international financial institutions adopted a declaration of environmental policies and procedures relating to economic development.[7]

The key to all of these decisions and declarations, however, is how well do they work, and what procedures exist to assist in the settlement of disputes if they do not work?

The Present Resolution of International Environmental Dispute.

If assessment does not avoid dispute, how are international environmental disputes now resolved? There are three primary groups who are involved; governments, international organizations, and private parties.

Diplomatic negotiation is the principal means of the resolution or settlement of international disputes, - - environmental or of any other sort. In the period since the UN Stockholm Conference on the Human Environment a number of international agreements have been concluded. Most of them provide in the first instance for resolution of disputes under the convention by diplomatic negotiations. This is appropriate. Some conventions, provide for administrative arrangements permitting citizens in one country who might be affected by a nuisance caused by environmentally harmful activities in another to bring that claim before the appropriate Court or administrative authority of the second state to review the permissibility of the activity and the question of damages.[8] This concept was later adopted by the Council of the OECD in its Recommendation on the principle of the Equal Right of Access in relation to transfrontier pollution.[9] Still other conventions provide for recourse to the International Court of Arbitration in the Hague, or the International Court of Justice also in the Hague.

In the private sector, international contracts sometimes are referred to the arbitration or mediation facility of the

International Chamber of Commerce, a private organization based in Paris with national chapters in many countries. One convention, the Baltic Convention on Marine Pollution provides for the possibility of mediation by an international organization, a third party, or a "qualified person".[10] Still other international agreements - - probably the largest number-- state that the parties shall settle their disputes by any peaceful means possible.

It is my basic thesis, one borne out by events to date and which I believe will certainly continue, that as shortages in resources and perceptions of environmental harm increase international disputes will increase in number. One should, therefore examine all existing techniques for dispute settlement and look at the possible roles to be played by all of the available actors to pick and choose the best ways of dealing with the problems. Future problems will make some of the environmental issues to date seem simple.

Environmental Dispute Settlement and the Future.

Therefore, in the remaining portion of this presentation I will try to suggest some ways in which environmental disputes can be settled, and look at the roles to be taken by a variety of actors - governments, international organizations and private groups. I have attached as an appendix to this statement, a discussion of the uses of mediation to settle Canadian-U.S. Environmental disputes that recently appeared in the American Bar Association publication Environmental Law. The present discussion is broader.

A. Negotiation. Negotiation is and probably will continue to be the principal means of settling international environmental disputes. Governments will be the principal negotiators. Sometimes they, or the real parties interested need help, because they are at an impasse, because all the parties are not adequately represented, or because there is too great a discrepancy in the power relationship between or among the parties. In such circumstances, they may wish to seek a third party. If the negotiation is being carried out pursuant to an international agreement, recourse to a specific third party may be called for.

B. The Role of Third Parties. Third parties can be brought in to use their own power and prestige (good offices or facilitation), can be asked to provide assistance and suggestions which to be accepted, must be agreed to by the parties (mediation or conciliation) or may decide on a course of action which the parties agree in advance they will accept (binding arbitration or judicial settlement). Third parties, to be accepted, must be independent of the parties - although neutral is the phrase often used.

Each of these techniques can be used as provided in an international agreement or on an *ad hoc* basis. There are roles which can best be played by governments (good offices or mediation) by international organizations or agencies (all of them) or private parties (good offices, mediation, or arbitration).

If the OECD, for example, uses itself as a forum to obtain agreement from members on procedures to harmonize the testing and assessment of data for new chemicals it is carrying out a valuable facilitating function. If an organization such as the OAS were to offer to provide a service to its members to assist in the assessment and settlement of environmental or natural resource issues, it could, with its considerable prestige, help to defuse disputes that may arise. If the U.S. - Canadian International Joint Commission were asked to decide whether one country can flood an area of a second against the other's will--even though the second country had agreed to the flooding- - it would help the parties out of an impasse in which they would otherwise have to grapple with these issues on their own. (This dispute over the raising of the Ross Dam on the Skagit River has been ongoing for almost 40 years) If a private mediator or arbitrator can be agreed to by parties to a site specific dispute, some of the costs of long term litigation could be avoided and an agreement worked out that all parties can live with. Where an internationally respected scientific authority can be given the responsibility to find facts which will be considered acceptable to governments and other interested parties, a course of action can be prescribed avoiding national or biased perspectives.

These are but some of the functions to assist in the settlement of international environmental disputes that can be mentioned. Many of them have been tried, some have not. What is often needed is a structure for bringing them into play.

C. The Need for Consideration of Dispute Settlement. When an international agreement is being negotiated the negotiators often ignore the possibility that disputes may arise under the agreement. Their job may be finished when the agreement is concluded. Others may have responsibility for implementation. If disputes are not anticipated, it may well mean that the agreement has no "teeth" rather than that everything is resolved by the agreement. This means that dispute settlement should be thought of long and hard by the negotiators and the international organizations involved during the negotiation stage.

A good example is the extremely complex and far reaching Law of the Sea agreements in which a separate committee was established early in the negotiations to develop appropriate dispute settlement clauses. These were agreed to despite the large number of states involved in the negotiation with diverse economic and cultural outlooks. Let me mention some examples - UNEP should give careful attention to the ways in which disputes arising under the regional seas program can be handled. So should Canada and the U.S. in negotiations on the long range transport of air pollutants. The provisions of the dispute settlement and enforcement clauses should fit the agreement and the parties to it.

Having effective well thought out clauses under consideration may give the negotiators confidence to accept provisions that they would not otherwise accept if concerns would not be fairly and equitably dealt with in the event of dispute.

Mr. Chairman. This is but a cursory look at the issue of international environmental and resource disputes. It is my hope that I have raised questions and begun a discussion. The subject of the settlement of environmental disputes may not have been appropriate in the first ten years after the Stockholm Conference. But now, to avoid the discussion would be a mistake. If the nations of the world are to build on the program of the last ten years, and not slide backwards, new mechanisms must be tried, and all possible groups - governments, international organizations, NGO's and private persons must be tapped. I hope these hearings will stimulate such a discussion.

Thank you Mr. Chairman.

Footnotes

1. A helpful set of definitions of dispute conflict is found in Cormick, G. "Intervention and Self-Determination in Environmental Disputes: A Mediatiors Perspective." Resolve newsletter. (1982)

2. Testimony of Professor Gilbert F. White, before this Subcommittee - April 1, 1982.

3. ECE Convention Long Range Transboundary Air Pollution November 13, 1979. 18 International Legal Materials 1442 (1979).

4. Memorandum of Intent, Aug. 5, 1980. T.I.A.S. No. 9856.

5. Executive Order 12114, January 4, 1979 - Provides for environmental reviews, by U.S. agencies. The attitude of other countries is depicted in a report by the International Institute for Environment and Development of six bilateral aid agencies.

6. See Stein and Johnson Banking on the Biosphere? Lexington Press (1979)

7. See 19 International Legal Materials 524 (1980)

8. Nordic Convention for Protection of the Environment between Denmark, Finland, Norway and Sweden (1974).

9. Recommendation C(76)55(Final).

10. Baltic Convention on Marine Pollution, Article 18, (1974).

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THE USES OF MEDIATION TO SETTLE CANADIAN-U.S. ENVIRONMENTAL DISPUTES

*by Robert E. Stein**

Introduction

The selection of this topic for a panel at the Canadian Bar Association carries with it several assumptions; first, that problems relating to the environment, be they domestic or international, exist and will continue to exist. This is not all bad. What conflict means is that there are a variety of groups with differing opinions on a particular set of issues and ways of doing things, and that each of these views is given a certain amount of credibility and credence or "standing" to be heard.

Contrast this "conflicting" situation with that of fifteen to twenty years ago in which certain environmental values were not considered at all. This was a time before there was a National Environmental Policy Act (NEPA) in the United States or an EARP in Canada. It was before the United Nations Conference enunciated the basic principle of environmental responsibility in its Declaration stating:

> States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or areas beyond the limits of national jurisdiction.[1]

A second assumption is that jurisdictional disputes in both Canada and the United States over environmental regulation and natural resource control provide an interesting set of legal and policy questions. Federal governmental negotiations between the two countries on a variety of subjects seem more difficult than they have in the past. The principal forum for venting trans-boundary environmental problems—the International Joint Commission—has been dormant because of vacancies on both sides.[2]

It is my belief that these times require new kinds of mechanisms and experiments. New approaches will not result in panaceas but rather should be added to the existing effective means of dispute resolution that exist between the two countries, and should be tried because some of the other mechanisms are not working.

The Uses of Mediation

Mediation is one of those techniques that bears closer examination. Mediation has been used in both countries in labor disputes involving postal workers and baseball players. Although these two strikes and resulting mediation have received a great deal of popular press and attention, environmental mediation has received much less scrutiny. In many respects environmental mediation differs from the labor model. There usually is no collective bargaining agreement, nor is there necessarily a continuing relationship between the parties after the dispute is settled. Third, there are often a multitude of parties with different and conflicting interests, all of whom believe that they have a right to participate actively in the resolution of the dispute: leave one party out and you may be faced with a lawsuit.

Before mediation can be used, however, one must examine the circumstances in which it can be most effective. Among the criteria to be applied are: a) where each party affected by a claim considers a mutually satisfactory settlement to be in its self-interest; b) where each party considers the need for such a settlement to be a matter of urgent priority; and c) where each party recognizes the need for and is prepared to make reasonable compromises to achieve a settlement because it believes that a mutually acceptable settlement serves its long term interest.[3]

One could add to that a recognition by both parties that existing rights at law or otherwise are not affected by entering into mediation. This enables parties to feel confident that, while they may be working towards an agreed compromise or settlement, their previous positions will not be compromised if no agreement is reached.

In February, 1976, the Governments of Canada and Manitoba, Manitoba Hydro, and the Northern Flood Committee, an entity of five Indian communities, entered into an agreement to mediate issues involving compensation for damages arising out of or attributable to the construction of a number of hydro-electric dams which would flood 100,000 square miles of land, rivers and lakes including wildlife resources. In 1977 an agreement was concluded on these issues. Including compensation from land flooded in the form of other land rather than money, the agreement also granted to the Indians the right to select land for development to broaden their economic resource basin opportunity. It also provided for Indian participation in a wildlife resource advisory council to manage the resources.[4]

The Manitoba mediation experience has served as a guide for establishing the process in Northern Ontario as well.

In the United States, mediation has been used to resolve differences involving road construction, solid waste disposal sites, construction of hydro plants, and, recently, the settlement of what must be the "granddaddy" of disputes involving environmental litigation in the United States—the construction of the Storm King pumped storage facility on the Hudson River.[5] In that case, Russell Train, formerly Administrator of the U.S. Environmental Protection Agency, was brought in as a neutral party between environmental groups and ConEdison and other utilities. The final agreement called for alternatives to the pump storage facility and agreement by the environmental groups (eventually supported by the federal EPA) that cooling towers would not be necessary on certain nuclear plants but that fish screens and other devices would suffice.

Mediation is being used to settle domestic environmental disputes. Why has it not been used for disputes involving both countries?

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This article is adapted from a speech delivered before the Panel on the Settlement of Environmental Disputes, Canadian Bar Association, Vancouver, B.C., Sept. 1, 1981.

First, mediation is considered a new and different technique, especially since it may involve private parties. Governments prefer existing techniques such as diplomatic negotiation and—between Canada and the U.S.—requests to the International Joint Commission. They perceive mediation as detracting from their own ability to control a dispute. This is a misconception since mediation is a voluntary process which requires the full support of the parties. Rather than derogating from the power of governments, it may in fact extend their ability to assist in the resolution of problems.

Second, there is often an unwillingness to try something considered brand new.

Third is the problem of cost. If a party resorts to diplomatic discussions to assist in the resolution of its problem the cost and much of the labor is transferred to the governments. Indeed, much of the mediation activity in both countries has been underwritten by private foundations and governments so that the cost to the parties may not be as great as they fear. The question of "who pays" should be addressed, and the costs of mediation weighed by the parties against other alternatives.

Fourth, parties will want to make sure that they are not locked into an interminable process. The timing must be agreed upon after which a decision should be made whether to end the process or continue.

Fifth, parties will also want to ensure that they do not lose any rights they might possess including resort to diplomatic channels and the right to sue.

If these obstacles exist, however, they can be overcome with time and the support of a number of groups inside and outside the government.

Both the Canadian and the American Bar Associations have looked at the issue of settlement of bilateral disputes. Their report treats mediation as an intermediary mechanism to "advise, accommodate and reconcile so that the parties may come to a bilateral settlement" and states that "these procedures are on the borderline between dispute management and dispute settlement."[6] While there has been little use of these kinds of non-binding techniques in the past, the report develops a rationale for their increased use in the period ahead. The report states:

> these non-legal third party procedures are used primarily where non-binding settlement is appropriate but the disputants have difficulty with direct bilateral contact because of strained relations with fundamental difference of background, approach or point of view. The United States and Canada have not found it necessary to use intermediaries to get bilateral negotiations started.[7]

It may be necessary, however, to use intermediaries to conclude the process. What is being suggested is that with the range of environment and natural resource issues that exist between Canada and the United States, or between a province and a state, or between individual entities in each country, we need to use whatever means we have at our disposal to ensure that the dispute is resolved.

It is also important to make sure that not every dispute becomes "a federal case" bringing in the full force of both federal governments where their role will primarily be a ministerial one.

How, then, can we increase the use of mediation for environmental disputes along the Canadian-U.S. border? Several suggestions can be made. First, panel sessions describing the nature and appropriateness of mediation will help increase the possibility of its use. There is a recognition that litigation, while it plays an important role in both countries, will not necessarily settle bilateral issues. In making this assertion I do not mean to diminish the role played by advocacy. Mediation puts advocacy in a different context in which the advocates themselves may play a greater role in the final decision than they would if a third party ruled on the question. It is important to reiterate that mediation is a voluntary process in which the parties themselves make the decision. However, as mediation can only work in situations where each party holds something that the other wants, the possibility of litigation can be used to help bring parties to the table.

A second way to increase the use of mediation is to insert a clause in legislation or international agreements calling for mediation as an option or stage of settlement of disputes arising under that statute or agreement. This is a different approach to the same technique suggested by the Canadian-American Bar Association Report, which calls for a general agreement on the resolution of disputes between two countries. In the United States Coastal Zone Management Act, for example, mediation is called for to settle disputes between the states and the federal government over the consistency of state CZM Plans under the Act.

Internationally, environmental agreements often contain bland anodine references to parties settling disputes through peaceful means, or make reference to a body such as the International Court of Justice. In only one instance, the Baltic Convention on Marine Pollution, is there a specific reference to the resolution of disputes by mediation by a "qualified international organization, a third country, or a private party."[8]

Canada and the United States often resolve differences through international agreements. Such an agreement is anticipated from the inter-governmental discussions on long range transport of air pollutants.[9] But, as with legislation in each country, an agreement itself is not the end point. Agreements cannot resolve problems although they can provide a framework for their resolution. It makes sense, therefore, to pay early attention to the way in which disputes are resolved under the agreement. The agreement should recognize that in Canada and the United States entities other than the federal governments have a legitimate and vital role to play in enforcement of the agreement. For instance, states and provinces are responsible for implementation of air pollution legislation; corporations, citizens and amenity groups also have a role.

Yet, in most cases, the agreement will not address these specifics. Rather, both parties are likely to be content with having drafted an agreement and will be unwilling to project the possibility of subsequent problems. Implementation, enforcement, and dispute settlement clauses should all form part of the negotiation process.

A third assist for using mediation lies directly with the power of the parties themselves. Each party must have some element of power that encourages the other party to seek a solution. Corporations and governments often possess such power. Citizens groups have commanded it by virtue of their ability to sue and cause delay. These abilities have to an extent been transferred to international problems between Canada and the U.S. In one case, an Indian band in Ontario has brought suit in Federal District Court in New York seeking to halt emissions from two aluminum plants near the border in New York and receive compensation for claimed damages. The case is still in court.[10] In a controversy over the raising of the Ross Dam in the Skagit Valley in British Columbia, the provincial and federal governments and citizens groups in both countries have gone to the International Joint Commission to seek to rescind or reopen an order of the Commission issued in 1943 which permitted the raising of the dam. This action has been opposed by the City of Seattle, the U.S. Government and business interests in the U.S. It also has not yet been resolved.[11] These disputes are of the type that might be assisted by mediation. In neither case, however, has mediation been requested by the parties.

A fourth issue is that of training, that is, educating parties to understand the mediation process so that they will not fear it. Learning to work with mediation as one of the panoply of techniques to assist in the process is important to its full and most effective use.

A fifth issue is the cost of involvement by a mediator, alluded to above. In the labor field, the public sector often finances mediation. If the mediation is *ad hoc* and international, a costly part of the mediation process is spent getting to the table.[12] The crux is that mediation actually begins well in advance of the signing of a mediation agreement, and the early stages may be among the most time-consuming. Whether founded directly by the parties or by an external source, the early stages should be recognized as an integral part of the mediation process.

A final and related issue is one of timing. Mediators or mediating organizations need credibility and legitimacy which must be developed prior to their selection. While this may appear self-serving—and probably is—it has a historical rationale. The U.S. Federal Mediation and Conciliation Service, the International Center for the Settlement of Investment Disputes of the World Bank, the Permanent Court of Arbitration, and the International Court of Justice were created and existed for some time before being effectively used. This was because their mere existence was considered valuable. Even now, some are still under-used. A member of the U.S. Canadian International Joint Commission remarked a little over ten years ago that the "Chairman of the Commission was partly full-time and the other two commissioners, fully parttime."[13] This past year the Commission had over one hundred days of executive sessions in addition to travel to and from meetings and days of preparations.

During this quieter period the institutions were developing credibility and learning the issues, and were available to disputants. In each case their potential users believed their role valuable enough to want to ensure their availability to at least some extent.

Conclusions

These, then, are some of the ways in which mediation may help resolve environmental disputes, whether local, international or both. Mediation is not a panacea to resolve irreconcilable differences. It is a means, however, of providing an approach acceptable to both or all parties while allowing them to hold to some of their earlier positions. It is a process which has worked in resolving other types of disputes, can be efficient in time and cost, and is relevant. Yet mediators cannot impose their services on unwilling disputants. As Canadian-U.S. environmental relations continue to be strained, mediation should be considered as a viable alternative. The problems and the times require it.

Footnotes

[1] Principle 21, United Nations Conference on the Human Environment Declaration.

[2] As of January 5, 1982, there are five Commissioners in office. The Canadian Chairman's position is vacant. In August, 1981 when the panel meeting was held there were no members to the Commission.

[3] Mitchell, L. "Mediation—An Alternative Method for Resolution of Disputes," Address to a Panel of the AAAS, Toronto, January 1981.

[4] *Id.* Mitchell sat as Mediator in this dispute.

[5] See *New York Times*, December 21, 1980, page 1.

[6] Report of the American and Canadian Bar Associations on the Resolution of International Disputes, at 29 (1979).

[7] *Ibid* at 30.

[8] Article 18, Baltic Convention on Marine Pollution.

[9] Pursuant to the Memorandum of Intent signed on August 5, 1980, negotiations formally began prior to the end of June, 1981.

[10] The dispute involves claims by the Saint Regis band on Cornwall Island that they have been harmed by emissions from Reynolds and Alcoa Plants in Massena, New York.

[11] This dispute involves the request by Seattle City Light to raise the Ross Dam which would flood the Skagit Valley into British Columbia.

[12] For a discussion of cost, as well as other issues, see Cormick, J., "Environmental Mediation in the U.S.: Experience and Future Directions," Address to a Panel of the AAAS, Toronto, January 1981.

[13] Statement of Rene Dupuy, October 1969.

Mr. **Bonker**. We are going to hear the whole panel, but I am curious, is your organization a consulting organization, in the consulting business with people who are looking for mediation services, or are you a research organization?

Mr. **Stein**. We do some of both. We are independent and neutral. If a particular party to a dispute wants to use our services, we will not do it that way. If all of the parties to the dispute do, then we can help. We as mediators and arbitrators act independently.

We have, for example, done work somewhat between mediation and research for both Environmental Canada and the Environmental Protection Agency, looking at the question of reciprocity under the U.S. Clean Air Act. We are doing work now primarily under grants from several foundations looking at the range of United States-Canadian energy disputes that have environmental implications to them to try to analyze the disputes, to see whether there might be some ways where possibilities of resolution might be the result.

Mr. **Bonker**. So you are primarily consultants?

Mr. **Stein**. In the sense any professional mediator-arbitrator is. Yes, we are consultants, but not for one side or the other.

Mr. **Bonker**. OK.

Thank you.

Mr. Eckholm, International Institute for Environment and Development.

STATEMENT OF ERIK ECKHOLM, VISITING FELLOW, INTERNATIONAL INSTITUTE FOR ENVIRONMENT AND DEVELOPMENT

Mr. **Eckholm**. Thank you, Mr. Chairman. I just spent the last year writing a book on global environmental issues 10 years after the Stockholm Conference, and I have submitted for the record a very brief excerpt from the book, which will be appearing in June.

But I would like now to make some remarks that diverge a bit from the submitted statement.

Mr. **Bonker**. Do you have a title for your book?

Mr. **Eckholm**. It's called "Down to Earth".

Mr. **Bonker**. That is the extent of the commercial.

Mr. **Eckholm**. OK. I believe that events over the last decade since Stockholm have fully justified the concerns about the world environment that were expressed at that time and fully justified the very positive U.S. leadership role that was played at that time. Certainly our understanding of many problems has changed over the last decade. As it has deepened, some things seem less pressing, and others that were barely perceived then seem more important.

But among the biggest changes in perception, which does relate ultimately to the role of the United Nations, I believe, has to do with the interrelationships between environmental quality and economic development.

It's widely understood now by both economists and those in the conservation community that these concepts are not in opposition to one another. Many more people now realize that the extreme poverty of close to a billion people are linked to some of the world's worst environmental problems, particularly those relating to destruction of the basic natural resources on which development depends—forests, soils, water resources, biological resources, and other resources of importance to the whole world.

On the other side, those involved in economic development have learned some lessons too. We have seen that development pursued without environmental planning and governmental regulation can have serious backlashes—the spread of disease after the construction of dams without proper analysis and planning, and unchecked pollution of air and water, which is becoming extremely severe in many areas of the world. Third World governments have little capacity to regulate pollution and it's having a serious human impact.

Gross abuses of toxic chemicals, unregulated workplace hazards, and particularly, abusive uses of pesticides in the Third World all are issues which once had been associated with rich nations but which, in fact, are probably taking a bigger toll in some Third World areas now than they are in rich nations.

The toxic chemical problems in particular are exacerbated by the irresponsibility of many corporations and developed country governments, who have refused to take any meaningful action in terms of notification and more stringent regulation of exports of hazardous substances.

Mr. BONKER. Mr. Funkhouser noted that the United States was considerably ahead of other countries in providing this kind of information.

Mr. ECKHOLM. We were the first nation to adopt export notices for some types of products, but as you are probably aware——

Mr. BONKER. Are those Government requirements or are they voluntary?

Mr. ECKHOLM. In most cases this is in the law. But a more comprehensive policy had been developed through a very arduous 2-year process by the Carter administration and an Executive order was signed which was then revoked by President Reagan immediately after assuming office, and part of that had been to undertake a more comprehensive international effort through the United Nations and elsewhere to get other nations along the same path.

But this administration has set back that whole process by several years, in my view.

Mr. BONKER. But is the United States still far ahead of other countries in posting this information?

Mr. ECKHOLM. For some substances I believe we are the only country that actually has export notification requirements in our laws, sir.

I wanted just to conclude by mentioning a few other problems I see in the Reagan administration's approach to some of these environmental issues.

First of all, there has been what I think is a very unfortunate tendency in some quarters, by all means not all parts of the administration, to try to deny these problems are real and that they are very serious, or to make endless calls for further study, to say that the science isn't good enough or say the problems just don't warrant any action.

This may be true for some issues, but I believe that for most of the major issues identified in reports such as Global 2000, whatever its flaws, there is abundant evidence they are quite serious and demand immediate action. Over the last 10 years I have visited 15 or 20 Third World countries doing research on environmental issues, talking to government officials responsible for resource management or regulation of chemicals, talking with farmers in fields, on hillsides in the Himalayas and in the deserts of the Sahel, with experts from our own AID program and other aid agencies.

These people daily face the consequences of resource degradation and the inability to properly regulate economic activity. It's not only globaloney, it's daily reality and a question in many cases of survival.

I think it's very unfortunate that some people, many of whom even admit they are not familiar with the literature on these issues, out of what seems to be political motivation, try to downplay these problems.

Second, I would like to comment on the administration's approach to international aid. In earlier hearings the AID administrator made a very good presentation, I thought, about some excellent new policies that AID has adopted on the environmental aspects of its program. This is all well and good, but I think we need to take a broader look at our international impact on development and the environment.

What is needed, above all, is a process of economic development that meets the basic needs of the poorest people—that will allow them to get out of the trap of having to destroy the basis of their own livelihoods.

I think reviving old trickle-down theories of development will not meet this need.

I think the administration's cuts in our contributions to the World Bank's IDA are completely undermining the benefits of these excellent AID policies on the environment. As for AID itself, the increasing politization, militarization, and what I would term simple-minded private-sectorization of AID activities again tends to undermine our programs to deal with the root causes of environmental issues.

Environmental impact statements are fine and needed, but if you don't have a process to provide basic food and fuel to the poorest of the poor, then it's all for naught.

Then third, I think the administration has demonstrated a basic misunderstanding of the role of Government and public policy in dealing with environmental issues. This, of course, has been said many times about domestic issues, but I think it's internationally true too. The fact is that for most environmental problems there is no substitute for public regulation.

I don't believe that an unconstrained private market has historically or will ever take the steps necessary to clean up the air and water. It has not taken the steps necessary to safely dispose of hazardous wastes. The unregulated private market did not do anything to protect Third World infants from misused infant formula; it has not done anything to protect Third World farmers from misapplication of banned pesticides. So when the rhetoric is stripped away, the administration's approach comes down to an abdication of public responsibilities.

In my testimony I mention several important functions I believe only can be carried out by an international body, and I think that the real challenge at this point is to improve and strengthen the United Nations environment program rather than crippling or killing it. I see a very startling contrast between the statement that was given to this committee by Under Secretary Buckley, which was largely positive about UNEP, and the actual budget proposals of the administration which would, in fact, cripple if not kill the agency.

Mr. **BONKER**. I think it should be noted, and you will find when you look at the testimony before this subcommittee, that our lack of support for UNEP has been an institutional problem that transcends administrations. The Carter administration was not that good either. We continually had to restore money, and if Mr. Buckley didn't intervene on our behalf this last time, we would have, or could have ended up with no money for UNEP, which is what the State Department recommended.

His personal commitment has kept it going. But I think absent him, we could possibly drop out of UNEP completely, which would probably precipitate the demise of that agency, unless Congress, of course, stepped in. I think it's one of the best international organizations in existence today.

Mr. **ECKHOLM**. Several other United Nations organizations also have important roles to play. The FAO is increasingly involved in some very good forest management programs and also in protection of soils.

UNESCO, through its biosphere reserves program, has the only systematic international effort to set aside a representative sample of ecosystems internationally.

WMO, WHO, and several others are involved in a variety of important programs.

So, in summary, I would say I believe the United States does have a good history as an environmental leader internationally, but now there is a great danger we will become an impediment to sound policies.

Thank you, Mr. Chairman.

[Mr. Eckholm's prepared statement follows:]

CHAPTER FROM "DOWN TO EARTH: ENVIRONMENT AND HUMAN NEEDS," BY ERIK ECKHOLM, 1982

Excerpts from Down to Earth: Environment and Human Needs, a review of global environmental problems written in commemoration of the Tenth Anniversary of the Stockholm Conference. To be published June 1982, by W.W. Norton, New York.

Erik Eckholm's books on environment and development issues -- Losing Ground, The Picture of Health, and Down to Earth, have been translated into ten languages. Currently a Visiting Fellow at the International Institute for Environment and Development, he previously worked at Worldwatch Institute, as a member of the State Department's Policy Planning Staff, and as a consultant to United Nations agencies.

Chapter 11

The Conservation of Humanity

This book, a survey of global environmental trends, yields good and bad news. On the positive side, public understanding of environmental imperatives seems to have increased over the last decade, and needed new institutions have evolved. On the other hand, many of the social, economic, and technological forces that underly environmental difficulties have scarcely been checked.

Appreciation of the material and spiritual importance of a healthy natural environment has spread. Perhaps the most dramatic intellectual shifts are occurring in the Third World, where understanding of the ecological underpinnings of human life--largely lost in the post-war dreams of industrialization--is on the rise. The new interest in environmental quality complements recent shifts in thought among development theorists, many of whom now stress the need to address the basic needs of the poor directly rather than hope that the benefits of growth will trickle down to them. Improving the lot of the underclass and protecting environmental quality are mutually supportive goals.

Both internationally and within nations, the new appreciation of our bonds with nature has spawned new institutions and policies--new UN and governmental agencies, new laws, altered aid programs, new international treaties. Yet for the most part, responses remain inadequate to the needs. In the words of the UN's World Environment 1972-82: "The ratio of words to action is weighted too heavily towards the former. And despite the evidence that people's perception of environmental problems has improved, it is less clear that many groups have adapted their lifestyles in response."

Many "environmental" trends are overt manifestations of other deeper currents. Hence specific environmental-control measures, while crucial, do not guarantee that degradation will be halted. The benefits of installing anti-pollution devices on cars can easily be lost as auto use soars; a protected forest will not remain inviolate if nearby people have no jobs or fuel.

More than anything else, the stone wall of inopportunity facing the poorest billion or so people insures the continuing degradation of natural resources in large parts of the world. The slowed economic growth of the 1980s means that any potential downward trickle of benefits has slowed to a drip. Even the sometimes dazzling growth of the last quarter century left a huge underclass with little chance to better their lives. An unknown but significant number are worse off than before. In the absence of wider economic and social reforms, efforts to protect wildlife and forests, to manage watersheds and arid lands, to clean up urban shanty towns and waterways, will never be fully successful.

Nor are birth rates apt to fall quickly among people with so little reason to have hope for the future. Despite the dramatic slowdowns in population growth in developed countries, China, and a few other places, the world demographic outlook remains menacing. Not only are human numbers projected to more than double in little over a century, but the increases will also be concentrated in some of the poorest regions.

What will happen to the African landscape as the population there quadruples? What will conditions become in Latin American cities, already reeling from immigration, as the continent's numbers triple? Where will the extra 3.5 billion people projected for Asia--an increase equal to the entire world population of the late 1960s -- find food, fuel, and shelter? The earth undoubtedly possesses the technical potential to sustain the projected increases. But realizing it will require improbable degrees of social organization and global cooperation, all the more so if climatic patterns start changing. The natural environment, and thus the quality of human life, will suffer grieviously as societies struggle to cope with multiplying numbers.

Energy choices have major implications for the environment. The seemingly unlimited availability of low-cost oil and gas up to the early 1970s fueled the automobile explosion, but also held down coal burning. Urban air benefitted greatly, and acid rain did not spread as rapidly as it might have. Renewed reliance on coal by utilities and factories seems likely to undo recent gains against air pollution and to acidify the rain over wider areas. Major commitments to coal and coal-based synthetic fuels probably also amount to acceptance of human-caused climate changes in the middle of the coming century -- changes which are bound to cause hardship for the underclass at least. Another major energy alternative, nuclear power, carries its own unresolved problems of safety, waste disposal, and weapons proliferation.

In parts of the Third World, soaring oil prices have exacerbated the scarcity of fuelwood. Kerosene, traditionally the main wood substitute, has been pulled farther out of reach of the poor. Villagers in a few places have actually been forced backward in history as the high price or unavailability of kerosene requires them to switch back to wood for cooking their meals and warming their homes. Whether tree-planting programs and alternative energy sources can be provided quickly and widely enough to avoid massive landscape damage and social hardship remains to be seen.

The increased use of renewable energy sources should reduce energy-related environmental damage. Governments have not yet granted renewables the same research support and subsidies they give other energy forms, especially nuclear power, thereby missing a chance to hasten their availability. Still, biomass production and large-scale hydropower development can cause significant damage to land and people if not properly managed. Increasing the efficiency of energy use remains the most environmentally benign response to the energy challenge, one not yet fully exploited anywhere.

In the absence of more stringent pollution-control regulations, and of stronger efforts to recycle materials and conserve resources, economic growth itself will inevitably mean increased degradation. The Organization for Economic Cooperation and Development (OECD) recently warned that existing environmental controls in the developed countries would be inadequate to prevent increases in pollution even with the slower than expected economic growth of the early 1980s: "Total pollution emissions in a number of sectors, assuming present quality standards and technology, could rise 30 percent or more between 1978 and 1985....If environmental measures were to be relaxed, deterioration would be greater. In the face of growth, even slow growth, only strengthened measures will maintain and gradually improve environmental quality."[1]

Unfortunately, a weakening of environmental regulations is now being urged by some politicians and businessmen as a response to economic difficulties. A broader public understanding of the economics of environmental protection, the society-wide costs and benefits involved, is essential if good ecology is to be good politics.

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Most of the world's critical environmental problems are rooted in local or national conditions, and must be confronted primarily at these levels. Still, global environmental policies and institutions are also necessary. International measures are not only needed to address the truly global threats, but also to aid countries in confronting internal problems of worldwide concern.

Events in the decade since the Stockholm Conference have not diminished the case for having an international environmental agency. In an era when human modifications of the biosphere can occur on nature's own scale, the monitoring of environmental trends and assessment of their significance is vital to the security of every country. With potential transnational threats to the climate, the oceans, and human health provoking international controversy, a global arbiter able to coax scientific consensus on the facts is essential--and then someone needs to keep reminding governments about long-term or subtle environmental threats they may prefer to ignore. An international actor can often help spur cooperative actions to protect shared resources, and encourage the development of international law on transboundary pollution and resource problems.

An agency is needed to facilitate the flow among countries of information and lessons of experience on environmental issues. Global public education about natural resource problems and their meaning for society must be promoted. Developing countries, which face unprecedented and dangerous pressures on natural resources, need assistance in planning for growth that is ecologically sustainable and in coping with the hazards of modern technologies. Finally, some mechanism is needed to coordinate actions affecting environmental trends of the many agencies of the UN system as a whole.

The United Nations Environment Programme (UNEP), the main institutional creation of the Stockholm Conference, has, with varying degrees of effectiveness, undertaken activities in each of these areas. In some, progress has been achieved:

-- The Regional Seas program has brought together countries in several regions to confront shared problems of pollution and coastal degradation that had hitherto been beyond the reach of international negotiations.

-- The UNEP-sponsored Coordinating Committee on the Ozone Layer has helped build international consensus on the dimensions of the threat to the statospheric ozone layer and its implications. Bringing together representatives of private industry, governments, and international agencies, the committee has set an excellent precedent for the analysis of other global threats.

-- Through the Global Environmental Monitoring System (GEMS), UNEP has promoted development of needed monitoring programs by other UN agencies and scientific organizations. Drawing the results together into meaningful assessments has proceeded more slowly.

-- The International Register of Potentially Toxic Chemicals maintains a data bank on chemicals on which governments can draw, and endeavors to spread information about newly discovered hazards and governments' regulatory decisions.

-- UNEP has, in cooperation with the International Institute for Environment and Development, extracted from multilateral development banks promises to adopt new environmental-impact study procedures when making loans in the Third World, although in many cases these have not yet become working procedures.

-- As the major funder, UNEP shares responsibility for the increasingly successful implementation of the 1973 Convention on International Trade in Endangered Species of Fauna and Flora (CITES).

-- A computerized network for the transfer of environmental information (INFOTERRA) has been set up, with 80 countries participating, although this service has been underused.

-- UNEP has provided funds to numerous private groups around the world for pioneering analytical work on the relationship between environment and development, for public education, and for the improvement of media coverage of environmental topics.

If programs such as these do not add up to a remade world, they nonetheless indicate that some action is under way. And several other UN agencies with larger budgets and more operational mandates are addressing critical global environmental issues within their sectors. Still, the scale and momentum of many environmental threats -- such as natural-resource degradation in the Third World, toxic-chemical pollution, and possible atmospheric disruptions -- far outweigh the hesitant efforts of the international community at cooperative research and solutions.

Obviously the world is not ready to hand over significant power to a global environmental authority, and UNEP's successes or failures should not be judged against such a standard. But a rising number of less ambitious programs could accumulate into a significant global response.

Sound information about environmental trends, combined with public concern and pressures, could expand the limits of political possibility. Governments are, for understandable if not always admirable reasons, unwilling to take costly measures on the basis of scanty data and disputed predictions. Hence the importance of pushing ahead with development of the Global Environmental Monitoring System, of accelerating the analysis of particular threats, and of communicating the results more widely.

The evolving GEMS program has established a high scientific standard and clarified the complex choices involved in the documentation of environmental trends. But, in part because of the inherent constraints, "the world community has not yet achieved one of the major goals of the Stockholm Conference--the compilation, through a global program of monitoring, research and evaluation, of an authoritative picture of the state of the world environment," to quote UNEP's own 1982 report on environmental trends. That report suggests adding a new element in future years: "even an imperfect series of environmental statistics, drawing together what we have (and, through its manifest inadequacies, providing a stimulus to better observation) would be an improvement on the present situation."

One can imagine a more aggressive UNEP sponsoring evaluations of a host of critical problems, working to build consensus on their dimensions and policy implementations. The process of research and analysis could be linked more closely to the development of global action plans, of new treaties or concepts in international law, of codes of conduct on responsible governmental and corporate policies, and the like.

Both in terms of subjects to cover and functions to perform, UNEP has an impossibly full platter, particularly since it has only about $30 million a year to spend. The organization's failure to define a manageable set of priorities is a commonly voiced criticism. Yet imposing realistic limits is not easy. In terms of subject matter, the Third World has from the beginning insisted that major emphasis be placed on issues of environmentally sound development such as human settlements and desertification. The developed countries have accepted this emphasis but have also insisted, quite properly, that issues of global concern such as monitoring, pollution, and atmospheric threats be addressed as well.

No simple blueprint for paring down UNEP makes sense. As the main coordinator and promoter of environmental action for the United Nations, UNEP must keep its fingers in many pies. The choice of emphases must be guided as much by where the pragmatic opportunities to make a difference lie as by abstract consideration of roles. UNEP's leaders must display sharp political judgement, remaining alert for half-open doors through which UNEP can push even as it continues to highlight the full range of environmental problems.

International needs are far broader than anything the UN system can undertake. Many treaties or policy commitments required for the management of transboundary problems (pollution of shared rivers, cross-border pollution, acid rain) can best be pursued by countries bilaterally or regionally.

Whatever determines the economic prospects of the absolute poor will have a greater impact on the future stability of the biosphere than any specific environmental programs will. Those who care about the environment must also care about reforming national and international economic orders to give the underclass a better deal.

The poorer countries desperately need financial and technical aid to help them confront the interlocking cycles of poverty, resource degradation, and rapid population growth. Enormous sums are required if clean water is to be provided to a higher proportion of humanity, if woodlots are to be planted on the necessary scale, if small-farm food production is to be multiplied as it must, and if family planning services are to be made available to all now lacking access. Third World countries also need help to develop the technical capacity to regulate pollution, the handling of toxic chemicals, and occupational safety.

Virtually all Third World countries are now undergoing wrenching technological and social transformations that pose huge ecological dangers. With so many people subsisting on the bare margins of life, these countries cannot afford to repeat all the ecological errors of the developed countries, nor to provoke the severe ecological backlashes that are peculiar to tropical conditions. Building institutions for environmental analysis and regulation, and for improved natural resource management, is no less important in poor than in rich countries.

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Books like this one invariably are said to be long on problems and short on solutions. Such charges often reflect a misunderstanding of the nature of the responses called for by the troubled relationship between human society and nature. In a general way we can describe institutions that are needed and approaches that have succeeded or failed somewhere. But overgeneralization about answers, especially on a worldwide basis, is not only futile; it can also be counterproductive, diverting attention from the true needs, which are specific to a place and a time.

The writer Shirley Hazzard made the point well in her 1973 book on the United Nations, Defeat of an Ideal:

> Nothing could be more indicative of our modern predicament than the simplistic call for "solutions" -- a cry that derives more from advertising slogans and political campaigning than from an understanding of human affairs, and which is put forward to repel complexities, as if the contemplation of a difficulty played no part in its resolution. Grave and intricate maladies that have accreted over generations will not be disposed of in a set of glib recommendations, or in the reiteration of exhausted abstractions. It is in fact far easier to propose the eternal "concrete measures" than to reckon with the fluidity of time and events in which these must be usefully employed.[2]

An easing of environmental, resource, and development challenges depends not on one-time solutions, but rather on the initiation of appropriate processes of change. First must come the perception that a problem exists, and an understanding of its relation to other aspects of life and to social goals.

Of course, broad approaches of proven value can usefully be identified and duplicated. To give one example, tree-planting programs that involve public participation in planning and the sharing of benefits have worked well in such politically different places as China and South Korea, while programs imposed from above have usually failed. These lessons can be drawn upon by those undertaking forestry anywhere. But success stories rarely provide replicable models. Rather, they suggest attitudes and approaches that can be starting points for successful action attuned to local conditions.

Public pressures and in some cases public participation in planning have been driving forces behind most of the environmental gains of the last two decades. Especially in developed countries, non-governmental organizations have pushed governments to curb pollution and preserve natural areas. It was the exceptional interest displayed by private groups that made the Stockholm Conference such an exciting and significant meeting.

More than is the case with many other matters of public policy, meeting environmental threats benefits from public organization and involvement. Sound environmental policies usually require acceptance of a longer-term perspective than either political leaders or businessmen are accustomed to. Also, the signals of an unregulated marketplace often ignore important ecological consequences of business activity. Citizen action -- to identify and publicize issues, to press for responsible government policies, and to work directly on environmental improvements -- can help offset the myopic tendencies of government and industry.

Over the last decade, nongovernmental organizations, ranging from peasant groups literally fighting for their livelihoods to city-based nature clubs, have increased in number and importance in parts of the Third World. Unfortunately, such groups often face governmental indifference or hostility. Sometimes, of course, this is the case in Western countries too. But the concerns and energies of ordinary people are essential resources in the struggle to create a more livable environment.

Technological change, the seeming source of many environmental problems, is sometimes also touted as the key to their solution. Potential research breakthroughs that could make a difference can certainly be identified. Cheaper solar power, cheaper and more effective ways to remove poisons from smokestacks and tailpipes, more reliable and safer contraceptives, hardier and faster-growing trees -- the list could go on. New biotechnologies, applying genetic engineering techniques to agriculture and forestry, seem to hold exceptional promise.

Still, few serious challenges will be resolved through technological progress alone. Appropriate social organization is usually the primary need. Higher yielding crops can contribute to the battle against hunger but will not automatically mean more food for the hungry; reforms in the distribution of assets, services, or employment are essential for that. Better contraceptives are badly needed. Yet unless their economic prospects improve, many among the underclass will continue to have little interest in family planning. The simple, low-cost method for treating the effects of severe diarrhea that was recently developed will save many lives. But unless health-care systems are reorganized, many rural children will not receive even this treatment. And only access to clean water, together with improved sanitary habits, will cut the awesome incidence of diarrhea and other infectious diseases among the children of the underclass.

. . .

In this context, global overspending on weapons research and arms appears doubly tragic. Now surpassing $500 billion a year, military spending soaks up resources badly needed in the fight for a more sustainable world order. Vital research frontiers go unexplored while military research budgets soar. And the sheer diversion of capital, talent, and official energy to military matters hampers the ability of societies to undertake the investments and organizational reforms essential to their future ecological security.

The failure of the superpowers to curb a weapons spiral that can benefit neither side sets the grim global tone on this subject. But developing countries, too, increasingly buy arms at levels far beyond identifiable security requirements, often with the encouragement of developed-country arms salesmen. Among the countries of sub-Saharan Africa, the proportion of total imports devoted to arms rose from 1.3 percent in 1969 to 9.3 percent in 1978, depleting already meagre funds available for productive investments.[3] One can acknowledge legitimate security concerns and still suggest that something is out of whack when the world is incapable of raising $80 million a day to provide clean water to all people, but lays out $1.4 billion a day on weapons.

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Over time, our understanding is deepening both of the influence human culture has on the biosphere, and of the influence the biosphere has on human culture. The troubled points in this inescapable relationship we have come to call environmental problems.

The biosphere seldom presents human society with imperatives; rather, we face choices about what sort of world we want to live in. Responses to environmental threats can be formulated only in relation to broader human goals. The issue is not whether societies can adapt to further environmental degradation, but what the price of doing so will be.

Civilization could undoubtedly survive the extinction of elephants and orchids, but the world would be spiritually as well as economically poorer. Civilization has for centuries accommodated a vast underclass living in extreme poverty and amidst extreme environmental degradation. That some forty thousand infants and small children die each day as a result leads many people to work for reform of the global social order.

Environmental choices must be guided by a vision of a desirable human society and of the quality of the natural environment needed to support that vision. In the struggle to create a more decent, a more human world, the environmental factor is gradually receiving its due respect. That may be the real legacy of Stockholm.

Notes

Chapter 11 The Conservation of Humanity

1. OECD, Environment Policies for the 1980s (Paris: 1980).
2. Shirley Hazzard Defeat of an Ideal (Boston: Atlantic Monthly Press, 1973).
3. Lance Taylor, "The Costly Arms Trade," New York Times, December 22, 1981.

Mr. **Bonker**. We will now hear from Mr. Robinson, professor of law at Pace University. He is also associated with the Sierra Club. Mr. Robinson.

STATEMENT OF NICHOLAS A. ROBINSON, PROFESSOR OF LAW, PACE UNIVERSITY LAW SCHOOL; MEMBER, BOARD OF DIRECTORS, SIERRA CLUB

Mr. **Robinson**. Thank you, Mr. Chairman. I am very pleased to be here today. I bring you the greetings of your constituent, my fellow Sierra Club board member, Richard Cellarious.

The Sierra Club has a number of members from the State of Washington.

Mr. **Bonker**. Where is Mr. Cellarious these days?

Mr. **Robinson**. He is, unfortunately for him, taking a leave of absence from Evergreen State College, going to teach at Maryland for a semester and escape from your lovely State, but I think he wants to get back there in a hurry.

I am going to be testifying today in a very summary fashion. There is an extended prepared written statement which I would request be added in the record, with your permission, Mr. Chairman.

My oral comments will be drawn from the 12 years I have spent and continue to spend as volunteer leader of the Sierra Club in its international program and also based on a year that I spent as an International Fellow of the Council on Foreign Relations studying the very question of foreign policy and environmental protection during the transition between the Ford and Carter administrations.

Much of what I learned at that time I think is still quite relevant. My views are also based upon a close observation of part of our Government's environmental protection program made when I served under three administrations as a public member of the U.S.-U.S.S.R. bilateral teams in the area of environmental protection, looking at environmental law between these two countries.

I should also point out, just by way of preface, I was speaking at Rochester Institute of Technology last night on a purely domestic question of environmental law, and people from Xerox and Eastman Kodak, as well as many other people from the audience, raised questions about international environmental protection and asked what is the legal community doing and what is the EPA doing and they criticized me and others for not talking about it that evening.

So I think these hearings are reflecting a broad concern among the American people as evidenced just by that experience I had last night.

I propose to divide my remarks into two halves. The first half would be in response to your question of what are the international agencies doing and how well are they doing it. The second half would examine what are the responses of the United States in terms of its foreign policy and how might that policy be improved.

When we ask, How is something being done, we have to ask, "What is the ruler; what are we measuring by; and by what tests?" I think there are really three tests by which our policies and international programs have to be examined.

The first test is how well are they looking at and dealing with local environmental problems. Obviously local environmental problems have an immediate local effect. Either the water is potable or it is not. UNICEF is doing much to improve drinking water abroad. Our Safe Drinking Water Act tries to assure the same thing here in this country.

But, more than that, these local problems can add up and become a global problem. They can add up incrementally and accumulate to become a larger problem, yielding a cumulative effect which transcends the small jurisdiction of the country. Coastal pollution, loss of tropical rain forests, or the emissions of chlorofluorocarbons are each in this category.

The second set of measuring rods which I think we have to pull out on the table involve regional problems, where natural systems, ecosystems, are not congruent with political boundaries. We have lots of experience with this category. The United States-Canadian Joint International Commission has recognized that we have shared a common environment with our neighbor to the north for a long time. The U.S. Boundary Commission with Mexico and our agreements on the salinity of the Colorado River reflect this category further.

A similar pattern which was discussed earlier this afternoon, are where we have trading relationships that involve regional environmental problems. Relations with our trading partners can be important. The question of international trade in chemicals has been the topic this afternoon. These are a kind of shared regional problems, if you will.

Finally, there are the global problems. These are somewhat self-evident, such as the question of marine resource protection, the carbon dioxide buildup in the atmosphere, or the question of protection of Antarctica. Since these are self-evident, I will limit my remarks really only to the first two categories.

How have the multilateral agencies measured up when you look at their ability to deal with the recurring local problems and with the regional problems? There has been a lot done within most countries. Much more, however, remains to be done.

Just because of the United Nations Stockholm Conference alone, many governments followed the lead of the United States and created environmental protection agencies. India just went ahead and created its Ministry last year.

A number of countries have emulated the inspired leadership of this Congress in adopting environmental impact assessment laws like NEPA or like the Washington Environmental Quality Act in the State of Washington.

Our environmental laws are models for other legal systems in other countries, and you will be interested to know that this is a nonideological copying. Others are looking at us because we have acted to manage technology responsibility. There are laws in the Soviet Union that are patterned after our laws. There are laws in China being patterned after our laws here. Throughout the socialist and the civil states, as well as common law countries, others are following our lead.

We have a stake in what happens to these local problems because of two different aspects. One is that environmental harm abroad can reach us here at home. Pesticide-ladened food is imported into this country and has to be dealt with because of pesticide misuse in other countries. Take a look at countries like Haiti, which has been so deforested that only 9 percent of its forests are left; it has a soil erosion problem; it cannot produce enough food. It has more people than it can support. We now have ecological refugees, who are partly political in the sense of the administration in that country. But the motivation to leave is also based on the destruction of the local environment. This local environmental problem then becomes a political problem for us, a very immediate one here in the United States.

We should do more to help these environmental protection agencies abroad do their jobs professionally and do it well because we do have a stake in what happens within their countries.

UNEP in its 1982–83 budget provides only $5.3 million for environmental education and training, and only another million for the development of environmental law. That is very small, and UNEP will not realize all of its income to be able to implement that level of activity.

Mr. Stein has referred to the leadership of the World Bank as another multilateral agency in developing lending criteria for ecologically sound development. We give almost no aid in this country to the United Nations University and yet one-third of its budget goes to develop natural resource protection and management through the training of persons in other countries and the transfer of intermediate technology.

Mr. **Bonker**. Is that the University in Tokyo?

Mr. **Robinson**. Yes. Its headquarters are in Tokyo, but it does not have a campus. It works through extension centers throughout the world and regional centers. It has not tried to create a university in a classic Western sense.

I could go on and explain the work of FAO, the World Meteorological Organization, the World Health Organization, UNESCO, and others, but we lack the time.

I would just point out that UNEP is doing something right now to work with all of these agencies. It is developing something called "A System Wide Medium-Term Plan", with a terrible acronym to go with it, "SWMTP". What this plan is, however, is a very positive initiative. It entails development of a 5-year plan to integrate the work and coordinate the work of these various United Nations agencies, all to make their environmental protection efforts more effective, to avoid duplication, and to streamline the operation.

Clearly, in light of the comments that we heard earlier this afternoon from the International Affairs Director of EPA, this is the sort of systematic reform that this Government should be supporting.

This Government should also be supporting another UNEP-funded activity, which is the World Conservation Strategy of the International Union for the Conservation of Nature and the Natural Resources. IUCN is an extraordinary little international organization, including 57 sovereign states, 119 governmental agencies, and some 300 private-sector groups. It is the only such creature in the world with this combination of constituents. It developed over the last several years the World Conservation Strategy which has been received and praised by most of the world's leaders.

I understand that at an earlier hearing session Mr. Buckley may have pointed out that President Reagan, although the strategy came out before he became President, had gone on record commending the World Conservation Strategy. Clearly there should be much more being done by EPA and other agencies to support the World Conservation Strategy.

If we could do more to help the local environments abroad, what could be done on the regional front, the second of my two measuring tests. Here we also need to do more.

UNEP has been extraordinarily successful in its regional seas program. It has developed a plan for the Mediterranean called the Barcelona Agreement, which is substantially the same for that expansive region as our Clean Water Act is for our expansive region in North America and does much the same as the Clean Water Act. To obtain this Agreement, UNEP had to negotiate between the Turks and the Greeks, and the Libyans and Egyptians, and Arabs and Israelis, and all of the other sometimes friends and adversaries of that region. They all laid down their swords and they all agreed to come up with a water quality plan which transcends their parochial national interests.

This is an extraordinary development. UNEP has proposed a similar plan for the Caribbean. Clearly, we have a stake in the Caribbean. We have territory there. We should be part of that Caribbean plan in helping to fund it. We did not do anything particularly for the Barcelona Agreement, but we should be doing much for the Caribbean plan.

Mr. **Bonker**. The subcommittee questioned Mr. Buckley on that because that area seems to be one of our vital strategic interests these days. Yet, we are not funding that very modest project. We are one of the few countries that is not.

Mr. **Robinson**. Yes. It's a strange development.

Mr. **Bonker**. It's a strong nondevelopment.

Mr. **Robinson**. I agree. We have another interesting initiative. That is the little unit in the State Department which Congress was quite responsible for bringing into existence, the OES. The Office of Environmental Affairs was instrumental in proposing into the United States-Panama Canal Treaty a little group called the Joint Panama-United States Commission on the Environment, which was to maintain environmental quality in the Canal Zone because the siltation would cause a problem in the Canal.

The Cattlemen's Association, the Sierra Club, and others are quite concerned that the safeguards in this part of the world be maintained because hoof and mouth disease, aftosa, is rampant in South America. If aftosa got a foothold north of Panama we stand to lose, if we cannot control it, over a quarter of the livestock and lot of our wildlife.

The Darien Gap in Panama and the Colombia jungle prevents the transmittal of this disease. Once our Highway Department helps the Colombians and the Panamanians finish that highway, the Pan-American Highway will open a direct vector for aftosa to move right up into North America.

The Joint United States-Panama Commission is a vehicle to help create quarantine conditions to keep that from happening. Here is a regional initiative we can take credit for; our State Department helped create this marvelous little Commission, but we are not doing much to fund it or get it off the ground. And once that highway is completed, it may be a little late in the game.

Mr. BONKER. When was the Commission created?

Mr. ROBINSON. It was created in the treaty, so when the Senate ratified the treaty, it came into existence.

We have three members and Panama has three members.

I could go on and discuss the importance for our regional trade patterns of the OECD. I think it is extraordinary that a representative of this administration in his prepared testimony would criticize the OECD for getting involved in environmental issues and developing standards and regulations. OECD's work is outstanding and merits strong U.S. support.

Robert Stein and I have participated in programs of the American Society of International Law in which there has been a careful professional analysis of just how important the standard and consensus building role of OECD has been. It is an extraordinarily good agency and it is not aggrandizing its turf by dealing with environmental issues.

Quite the contrary. It is a vehicle for the developed world to come to grips with, and in a sophisticated way resolve environmental problems in a way that will encourage commerce and international trade rather than complicate trade relations.

What is the role of the United States in all of this, to get to the second part of my remarks. I apologize for getting wound up and taking so long to reach this aspect. One thing that this administration should do is not simply to announce that it wants to cut back its contribution to UNEP. We should be asking other nations to contribute more to UNEP. It should be part of our foreign policy to expand the donor group to UNEP.

We have contributed in the past decade one-third of UNEP's Environmental Fund income. That is an extraordinary commitment. This Nation deserves substantial praise for that and, as you point out, Mr. Chairman, this Congress has seen that it happened. I know the Sierra Club has testified a number of times before committees of this Congress in favor of UNEP funding.

The other third, however, in the same decade, comes from only four others, the Soviet Union, Japan, West Germany, and Sweden. Of the other third coming from the rest of the donors, 60 United Nations members give nothing. Such limited donations are not widespread international support for the United Nations Environment Fund of UNEP. This is the record of the fund as opposed to the contributions to the agency itself.

I think we should have a foreign policy in this country that encourages all U.N. member states to contribute to UNEP. If we would now cut back, we are certainly not going to be encouraging others to make contributions.

The flip-flop in our foreign policy from administration to administration breeds great instability in the world and I agree with the comments, Mr. Chairman, you made earlier and I think it is the opinion of most people, in the Council on Foreign Relations and in other groups like the Sierra Club, that we ought to have a much more consistent foreign policy and constantly changing impedes our credibility.

We ought to be doing more, therefore, to continue this record of support of UNEP, and using UNEP through its systemwide process of integration to coordinate what goes on among the multilateral agencies and encourage collaboration to support the World Conservation Strategy of IUCN.

The only way we will do that is to have a strong foreign policy unit in this Government. That unit has always been the OES in the State Department. It has the capacity to view a big picture. It can see what the line agencies cannot. CEQ is too small and under too many different pressures. We need a stronger group of professional experts in OES to provide guidance which lasts beyond one administration.

We need a group of people in OES who are not FSO's, foreign service officers, who are rotated every 2 years, because, frankly, the technical staffs in the Interior Department and in EPA do not rotate every 2 years. We need to have expert people in the State Department who stay as long as some in-line agencies in order to keep the liaison open.

We should have also a professional operation in EPA that helps the similar groups in other countries. Fitzhugh Green tried to develop some of this. I do not see it happening very much today.

Mr. Chairman, in closing, I would like to thank you for your patience and for hearing these views. The Sierra Club is vitally concerned with these hearings and wishes to go on record thanking the subcommittee as a whole and the chairman for his initiative and leadership in conducting these hearings.

[Mr. Robinson's prepared statement and attachments follow:]

PREPARED STATEMENT OF NICHOLAS A. ROBINSON, PROFESSOR OF LAW, PACE UNIVERSITY LAW SCHOOL; MEMBER OF THE BOARD OF DIRECTORS, SIERRA CLUB

Mr. Chairman, Members of the Subcommittee:

I appreciate the opportunity to present testimony on behalf of the Sierra Club in this series of hearings to review the status of the global environment on the tenth anniversary of the Stockholm Conference. I have been asked in particular, to comment on the major strengths and weaknesses of the United Nations Environment Programme, the role it should play in addressing global environmental problems in the 1980s, the role of other international organizations, and recommendations for current and future US policy towards international organizations on global environmental issues.

I want first to thank Patricia J. Scharlin, Director of the Sierra Club International Earthcare Center, who assisted in the preparation of this testimony. She was unable to testify herself because of other commitments. In view of her close association with the United Nations Environment Programme since its inception and her previous background in the field of international organization and economic development, her ideas and suggestions have been invaluable.

The Sierra Club is a citizen organization with a membership of 300,000, including members residing in 67 foreign countries. Founded in 1892, the Club works in the United States and other countries to restore the quality of the natural environment, to maintain the integrity of ecosystems and to promote the use of prudent resource management so that future generations may be assured of a secure and healthy life. Since 1972, the Sierra Club has had an active international program focusing on global, long-term environmental issues which transcend national boundaries and whose resolution require cooperation at the international level.

I will focus most of my remarks on the niche that UNEP fills within the UN system and the role of other international agencies and institutions in the UN system and offer some thoughts on the direction they should take in the future.

One major event which had a major impact on the world community around the time of the UN Conference on the Human Environment was man's landing on the moon a few years earlier. That view from outer space of a beautiful blue planet moving in the void of space provided a theme and sense of oneness that was shared by all the governments that met in Stockholm to address the global environment. The Secretary-General of the United Nations, U Thant, said at the time "Like it or not, we are all travelling together on a common planet. We have no rational alternative but to work together to make it an environment in which we and our children can live full and peaceful lives. To produce at any cost, without due consideration of effects on the environment, can no longer be the central preoccupation of man."

We have witnessed many more trips into outer space since then, but none has produced the realization, like those first pictures, that we do indeed live on "Only One Earth."

There have been a considerable number of studies in recent years that point to disturbing trends that our earth's resources are being used up while our need for them grows apace. Regardless of one's view about the accuracy of the forecasts, as a society we cannot ignore that they are warnings. (For list of global trend studies, see Appendix A.) For the UN system this concern for natural resources depletion is not new. As early as 1949 a UN Conference on the Conservation and Utilization of Resources was held at Lake Success, and the fragility of the earth's biosphere was highlighted at a Unesco conference in 1961. This latter conference gave rise to an important international program of interdisciplinary scientific research called Man and the Biosphere. The United States joined this program and maintains a national committee for scientific research, but I regret to say that the budget for the research work, which combines social scientists, natural scientists, development planners and local participation, has been radically cut and thus the United States' role has diminished significantly. I will discuss this in more detail later in the testimony.

In addition to UNEP and Unesco, the Food and Agriculture Organization, and, more recently, the World Meteorological Organization (WMO) and the World Health Organization (WHO) are the main UN bodies concerned with enhancing the human environment. But other organizations are becoming involved in the process of planetary management, and nearly every agency and body of the UN concerned with development now has an environmental office.

In 1948, international concern for the environment led to the formation of the International Union for Conservation of Nature and Natural Resources. An international non-governmental organization with a membership combining sovereign states, government agencies, and national and international non-governmental organizations, the IUCN has focused primarily on conservation of species and habitat, and on establishment of national parks throughout the world. Recently, with financial support from UNEP and the World Wildlife Fund, IUCN has prepared a comprehensive plan for conserving the resources of the planet. Called the World Conservation Strategy, the plan is to help governments build ecologically sound management concepts into development planning at the national, regional and international levels.

UNEP AS CATALYST

The United Nations Environment Programme was established by the General Assembly in 1972 to serve as a small facilitating body within the UN system in addressing the environmental priorities laid out in the Action Plan developed at Stockholm. Its agenda encompassed the environmental concerns of both developed and developing nations, and ranged from human settlement, health and well-being to management of resources, control of pollution and protection of species.

In the period prior to the Stockholm Conference there was never government support for establishing a separate environmental organization within the UN system. Instead, the plan supported by the Conference Secretary-General, Maurice F. Strong, was to have a small, high-level secretariat with an environmental fund which could be used to stimulate the insertion of environmental concerns in the programs of national, regional and international institutions. As the first Executive Director of UNEP, Maurice Stong did much to shape this UNEP role as "catalyst" and "coordinator."

But a major consequence of this decision has been UNEP's inability to assert much influence over the policies and programs of the large and well-entrenched specialized agencies, which from the beginning of the Conference preparations have protected their own fields of interest. This fact, combined with limited funds and a program so broad that there can be no concentration on solving a few critical problems, has produced a great deal of criticism about the effectiveness of UNEP.

The ailments of UNEP are not unlike those of the UN system as a whole. With a Governing Council of 58 member states selected through the customary UN formula of adequate geographical and political representation, UNEP is subject to the same political and economic pressures as other intergovernmental bodies. From the very beginning, UNEP has had to walk the fine line of satisfying the demands of the Third World for projects more closely related to their national needs, and the demands of the developed nations which believe that the UNEP program should address problems with global implications. At each Governing

Council session the actions of the previous year are reviewed and new topics are inevitably added to the list for action.

There has been perceptible improvement in the relationships among the UN agencies, probably as a result of the Administrative Coordination Committee, which provides a mechanism for regular consultations. To this end all the agencies with projects affecting the environment have a designated UNEP contact or "focal point." However, the agencies are not yet structurally equipped to integrate effectively environmental aspects into their development projects and program activities. The structure for this is more on paper than in the field. For example, FAO has set up an Environment Program Coordinating Unit, to facilitate cooperation with UNEP and other agencies, and has an environmental program devoted to assessment and management of natural resources for food and agriculture, and control of related problems of pollution. Those familiar with FAO field projects are not impressed with how this unit functions. To encourage the agencies throughout the UN system to work toward greater integration, UNEP conducts bilateral meetings with many of the agencies, which are now participating in a medium-term, environmental program to co-ordinate planning over six-year periods, the first covering the period 1984-89.

Where has UNEP been effective in carrying out more than 150 separate proposals in the 109 recommendations accepted by the 113 governments that attended the Stockholm Conference? What have we learned about planetary management in the past ten years?

A report by an independent research organization on the implementation of the Stockholm Action Plan, to be released for the Session of Special Character, indicates that nearly 30 percent of the 109 recommendations were implemented in their judgment and 40 percent were partially carried out. Only 15 percent were not addressed to any significant degree. (1) Over the past ten years, the Sierra Club assesses the major program areas which we are familiar with as follows:

Good Progress: Global Monitoring, Conventions and Protocols, Regional Seas Cooperation

Medium Progress: IRPTC, Periodic Reports on Environmental Issues, Tropical Deforestation Data Collection

Slow Progress: Industry Cooperation, UN Agency Cooperation, Health Issues, Technical Assistance, Disaster Warning System, Desertification, Information and Training, Building Institutional Structures, Resource Management and Conservation.

There are two areas in which UNEP can play a particularly useful role. One is in monitoring and assessing the earth's "outer limits" and another is in assisting in the development of an environmental infrastructure at the national level and encouraging the inclusion of environmental considerations in international activities and institutions.

Through the "Earthwatch Program," initiated at the Stockholm Conference, UNEP was given responsibility for setting up a Global Environmental Monitoring System (GEMS) to collect data on pollution and land and ocean changes. The technical, political, and financial problems inherent in such an ambitious effort severly limited the initial operations, but data are now becoming available, in particular on the state of the world forest cover. Collecting and transmitting information through an international network entitled INFOTERRA has proved equally difficult. Some 150 "focal points" have now been set up around the world, drawing on 9,000 sources; however, they have not been well utilized to date.

The problem of toxic chemicals has elicited an increasing degree of international cooperation. UNEP, in cooperation with WHO, has established an International Register of Potentially Toxic Chemicals. After a slow start, it too has begun to function better, providing information to governments to help them determine the conditions under which the chemicals should be used.

There has been some success in including environmental assessment procedures into development grants by major international financing organizations. The World Bank was the first of the international lending agencies to set up an environmental review procedure for projects, and that procedure is increasingly being incorporated into the planning phase, instead of being an "add-on" item included after the project is well under way. The World Bank is one of 10 major development institutions which, with the encouragement of UNEP, recently signed a Declaration of Environmental Policies and Procedures Relating to Economic Development. (2) It is designed to build "appropriate environmental measures" into development projects, and to provide technical assistance on environmental matters to developing countries.

In 1975 and 1976 UNEP played a central role in obtaining agreement on a convention and series of protocols and an action program for controlling pollution of the Mediterranean Sea. What is truly remarkable about this program is the degree of cooperation that exists among the riparian states -- Israel and the six Arab states of Algeria, Lebanon, Libya, Morocco, Syria, and Tunisia -- even though they are political enemies on Middle East issues.

Other regional seas programs have also been developed, including the Persian Gulf, along the west coast of Africa and the west coast of South America, and in East Asia. One closest to home involves the Caribbean. I am sorry to note that the US so far has not provided any funding for the Caribbean Action Plan even though its first priority is to establish contingency plans

BEST DOCUMENT AVAILABLE

for oil spills -- of obviously direct concern to the US in view of the recent IXTOC spill in the Gulf of Mexico. (3)

The Stockholm Conference and Action Plan spearheaded a process that is still at an early stage. But after a decade, one can see certain positive changes. Environment is no longer a confrontational word opposed to development, and environmental considerations are included in most major international decisions relating to resource management. Many developing countries now actively seek assistance or assurance that development projects protect the resource base.

In the last decade the number of international agreements on global resource management and regulation of pollution has grown, the most notable of these being the draft Law of the Sea Treaty. In Article 65 of the current negotiating text, for example, international recognition is given to the need for stringent standards to conserve marine mammals within the 200-mile economic zones. Another article (Article 165) relates to environmental protection provisions governing the deep seabed mining of manganese nodules. Even the US review process of the Administration and subsequent proposals for change in the treaty text did not touch these items. Another significant resource agreement, the recently signed Convention on the Conservation of Antarctic Marine Living Resources, contains a key article which provides for an "ecosystem" approach to the harvesting of the living resources in the Southern Ocean.

THE NEXT TEN YEARS

When we look ahead to the next ten years or more, we should first consider some of the changed perceptions that have evolved since the Stockholm Conference. The 26 principles of the Stockholm Declaration served to set the stage for a new approach to the meaning of the global environment, recognizing the basic need for economic and social development but paying attention to the importance of safeguarding the planet's capacity to maintain its renewable resources. The overall goal was directed toward a better quality of life for all mankind.

In the past decade we witnessed a growth in scientific knowledge of environmental processes, of what is happening to these resources and how to manage them better. I think we have learned to appreciate how interdependent the world is and now that we recognize this we are beginning to look for ways to cooperate more effectively within regions and across hemispheres -- north to south, south to south, north to north. New and innovative forms of cooperation should be encouraged and working within regional ecosystems may prove a means for improving intergovernmental cooperation.

In the last ten years attention was focused on developing the capacity to forecast global environmental trends. Many of these have concentrated on the problem of continued population growth and consumption of the resource base. As a recent Worldwatch Paper states, during the past thirty years following World War II "Few stopped to calculate, for example, that a 3 percent annual rate of population growth leads to a 19-fold increase in a century, or that a continuation of the 4 percent annual rate of world economic growth that prevailed from 1950 to 1973 would lead to a 50-fold expansion of the global economy within a century -- and to an associated increase in demand for resources. With the benefit of hindsight, it is now obvious that between 1960 and 1976 -- as world population went from three billion to four billion -- human demands began to outstrip the sustainable yield of the basic biological systems that support the global economy."

Thus, in a very short time, we have lost vast amounts of forests for our wood supply, fish, grazing land for beef and food products, and soil erosion has seriously affected agricultural production. As we move toward the next century the US will be facing increasing pressures on its croplands as a result of both soil loss and greater demand for food from other countries. The energy picture is more complex, but without doubt fuel needs beyond 2000 will continue to be linked to economic growth, and price increases for energy from all sources will be substantial. By 1994 FAO predicts an annual shortfall of 650 million cubic meters of fuelwood, and an increase in the use of dung and crop residues, which in turn will seriously affect agricultural output and place serious pressure on the earth's biological support systems.

Combine these grim facts with projections indicating atmospheric changes, increased pollution of air and water, and accompanying loss of genetic diversity. It is hard to believe that international institutions can do anything fast enough to prevent irreversable degradation. Time is running out if we want to maintain a human society even somewhat as we know it today. International institutions which are still rooted in the nation-state system are inherently slow moving. What is most needed is a change in human perceptions and values. But this too takes a very long time or a major economic or political upheaval. We are in a developing crisis situation already, but it is one that is not immediately apparent to the average citizen or policymaker.

We would list the following issues as requiring urgent international attention:

Ten Environmental Goals for the Next Ten Years

1. Preservation of biological diversity.

2. Conservation and management of tropical forests.
3. Management of the use of chemicals.
4. Improvement of basic water supply and sanitation.
5. Maintenance of food production, especially by preventing loss of productive land, including introduction of integrated pest management techniques.
6. Monitoring and assessment of atmospheric processes, especially CO2 build-up and protection of the ozone layer.
7. Pursuit of environmentally benign energy alternatives to oil.
8. Conservation and management of marine living resources.
9. Improvement in forecasting and preventing natural disasters, especially those stemming from poor environmental practices which can be averted.
10. Expansion of training and information on methods of environmental management and development of the institutional structures required to maintain sustainable development.

What can be done to achieve these goals?

As a nation rich in natural resources, the US should take a leadership role in promoting a more integrated response to altering global trends so that our own resources are not squandered. The UN system affords us one tool that can be used in achieving this formidable objective. It can be an effective tool especially in obtaining information and cooperation from a community of independent sovereign nations.

Utilizing UNEP and other international organizations for their main purpose is essential. We should discourage attempts by governments to use them as forums for extraneous purposes, especially political ones. Their agendas should not be cluttered with a favorite issue of every country when at the same time the countries do not back project proposals with adequate funding. UNEP should be organized so that it can seize opportunities for fast, effective action on key issues and not allow itself to spread its energies among all the environmental problems of the world.

Narrowing these generalities down, we believe that UNEP should focus more directly on its global monitoring role. It should utilize scientific institutions to handle the technical aspects and concentrate on building up its ability as data collector and, most important, information disseminator.

UNEP should pay special attention to ways in which environmental considerations can be infused into development projects supported by bilateral and international agencies and lending institutions.

UNEP should spend more time and resources on new and innovative methods to train, educate and inform people at all levels about the environmental implications of development and resource management procedures. Keyed to this is the need to encourage the further development of environmental laws at the national, regional and international level as a statutory basis for environmental management.

In November 1981 a group of experts at a meeting in Montevideo called for development of laws over the next decade in the following areas: marine pollution from land-based sources; protection of the stratospheric ozone layer; transport, handling and disposal of toxic and dangerous wastes; international co-operation in environmental emergencies; coastal zone management; soil conservation; transboundary air pollution; international trade in potentially harmful chemicals; protection of rivers and other inland waters against pollution; legal and administrative mechanisms for the prevention and redress of pollution damage; and environmental impact assessment.

Equally important, UNEP must devise better means of disseminating its information and training tools. One means that has been under utilized by all UN agencies is the non-governmental and private voluntary sector. Many of these organizations work at the community level and have the ability to communicate information and teach local people in ways that they will understand and accept. The scientific and professional organizations can also potentially provide much more assistance in carrying out UNEP programs. If the funds for large-scale programs continue to diminish, NGOs and PVOs should be called upon to help fill program needs. This is so important that we urge the US government to suggest to the Tenth Governing Council that a special office be created in the UNEP secretariat at the highest level to focus on utilizing NGOs and PVOs in the implementatin of the UNEP program.

Greater support should be given to programs of other international agencies that are aimed at improving the quality of life and protecting the resources of the planet which can best be carried out at an international level. An example of this is the work that the World Health Organization is doing in the development of standards and guidelines for drinking water quality. Scientists from 18 countries, experts in epidemiology and toxicology are participating in this program which is an important public health element in the International Drinking Water Supply and Sanitation Decade (1981-1990). Other agencies that are cooperating and can utilize the results are the World Bank, UNICEF and the UN Development Program, in addition to bilateral aid programs. WHO is also cooperating with UNEP in the dissemination of information on use of potentially toxic chemicals. No one country can attain the credibility for providing objective information of this kind. As more and more people gain access to pharmaceuticals and agrochemicals, the role of WHO and UNEP in explaining and assisting in the use of these substances safely should be expanded.

The Food and Agriculture Organization has been criticized by some ecologists for not paying enough attention to appropriate land management in their sectoral approach to resource development. By setting up a separate environmental coordination office without adequate funding or oversight, little progress can be expected in incorporating environmental assessment and planning procedures into development projects. Another organizational approach should be considered in which the environmental aspect is incorporated within each sector and then unified within the agency's long-term, comprehensive planning. With the introduction of an integrated long-term program planning process (SWMTEP), to be discussed and we hope approved at the Tenth Governing Council, a significant step will have been taken toward addressing the chronic problem of coordinating the long-range programs of international organizations.

But a process on paper is not enough. It must be backed up by the governments supporting the effort. One way to do this is to assure that the governmental representatives involved in program planning at the policy level for international agencies are the same or at least are well coordinated at home. We cannot expect international coordination from agencies when the representatives attending policy level meetings are always different.

Earlier we mentioned the importance of utilizing international scientific research programs. One in particular deserves special consideration. It is the UNESCO Man and the Biosphere Program mentioned earlier. The program provides an opportunity for participating governments to network with each other in monitoring and assessing the impacts of human activities on various ecosystems -- tropical forests, arid zones, mountains, etc. It is a modest program utilizing a small secretariat which helps to coordinate the interdisciplinary research that is shared by all participating countries. Sad to say, the US MAB research program which has never really had sufficient funding was cut in half this year.

The program has direct benefits for the US. For example, we have cooperative research projects under way with Mexico studying the human impacts on arid areas especially focusing on the affect of urban growth in the southwestern US and northern parts of Mexico. The studies are addressing such problems as water needs to sustain growing populations in the area. Another research program is focused on the impact of energy exploration and other industrial activities in the Arctic. It involves Canada, the Scandinavian countries the US and the USSR in cooperative research.

The Sierra Club firmly believes that this kind of international scientific research program that seeks pragmatic solutions to balancing development with protection of ecosystems should be supported with increased funding. Our own national program needs a regular and guaranteed level of support of at least $1-2 million yearly so that the research can be based on careful planning. The establishment of a global network of Biosphere Reserves is another important element of the MAB program. The US has cooperated by establishing 37 reserves which are used in global and national monitoring of human activities on the ecosystem. We would urge that the US support financially and scientifically the establishment of Biosphere Reserves to cover all the biogeographical provinces of the world as the best way to protect global ecosystem diversity.

I have confined my remarks primarily to the UN system because the Sierra Club has worked more closely with these organizations. We do not mean to infer that other international organizations should be overlooked. In fact, we believe that utilizing specific regional political or economic organizations is desirable. The OECD and the Economic Commission for Europe, for example, should continue to play significant roles in developing standards for pollution control and the use of hazardous subatances much of which is produced by industrialized countries. The international cooperative efforts to halt desertification in the Sahel should be supported and enhanced through increased funding and greater coordination with other development projects in the region.

Data gathering institutions like the International Institute for Applied Systems Analysis and scientific institutions like the Scientific Committee on Antarctic Research where US and Soviet scientists participate and exchange information should be supported. Often they provide the best means of maintaining contact with the research and technology going on in socialist countries and together with ours may help solve some of the environmental problems that lie ahead.

A brief word should be said about funding UNEP's program and other specialized agencies. Without a reasonable and reliable flow of funds into UNEP, the secretariat cannot function as a catalyst and promoter of environmental concerns into development projects.

FINANCING

UNEP's budget of $30-35 million annually is extremely modest compared to other international agencies. (4) (Funds available to the UN Development Program in 1980, for example, totalled about $845 million). But UNEP can still run an effective program with a moderate level of funding if it is not hampered by the slow payments from contributing governments. Most of the contributions now come in at the end of the year and UNEP never knows just when or how much. Thus, the secretariat cannot accurately estimate the cash flow. Another element that has affected the management of programs has been the contributions in non-convertible currencies, e.g. Russian rubles. By mid-1982 UNEP will no longer have sufficient convertible currency cash reserves beyond the requirements for three months ahead. This obviously makes management of the Fund very difficult and planning for the next year is virtually impossible. Without an increase in contributions UNEP will be forced to cut its already modest sized staff by 25 percent. We strongly urge the US to support UNEP at the $10 million traditional level set by US funding for fiscal years 1978-81. New ways should also be explored to provide the funds so that UNEP's small management staff does not have to spend most of its time travelling around the world fundraising.

The same can be said about the funding of the other specialized agencies, especially those with programs related to resource management and health. Their activities can be more effective than bilateral programs because they are often trusted more easily by recipient countries. Recent US cuts in voluntary contributions to these agencies have had a damaging affect on programs and may also create a chain reaction among other donor nations further reducing funds directed toward improving the health and well being of two-thirds of the world. No one country can be effective alone in attending to these needs and for such a small amount of money. Instead of reducing our contribution to these agencies, we strongly urge that the US share be raised to at least .7% of our GNP for UN programs. (That is to say, voluntary contributions to international organizations should be an amount proportionate to the recommended UN assistance level of 0.7% of GNP).

UNEP's record of achievements in the first decade of its existence are in many ways remarkable, considering all the factors that can affect performance of an international organization. UNEP deserves both our support and our constructive criticism which should be aimed at strengthening its capabilities.

The next ten years -- or less -- will be crucial in shaping international institutions to play stronger roles in planetary management. The Sierra Club believes that the United States must be a leader in reordering human values and institutions that will help the world community to adjust its systems in time to avoid major social, economic and ecological upheaval that will inevitably result if we continue to lose our global resource base. Major financial investments will also be required to support reforestation, cropland production, development of alternative energy sources and for efforts to curb population growth. We urge that the US government work toward reducing global military expenditures, now estimated at $550 billion, as the best means of securing the vast sums of capital that will be required. A major cutback on military expenditures will also reduce the heavy drain on natural resources.

Recognizing that poverty and disease contribute to the deterioration of the natural environment, we must increase efforts, nationally and internationally, to raise the standards of living and human health of all peoples. This will require acceptance of a new international economic order and much larger technical and financial inputs into the economic development of Third World countries. If we fail to do this, we will only have more Haitian-type refugees streaming across our border creating further political strains and a potential for major conflict. International organizations can be an effective and equitable way of helping to reorder these social, economic and environmental processes.

In conclusion, we want to emphasize again that without more trained development planners and informed policy makers and without an aware public, there is little hope of preventing the degradation of biological processes in the world. A weakened resource base will breed more poverty and social decay which, in turn, will lead to greater political instability and eventually international conflict. We should use the tool of the UN system, and UNEP as a catalytic force, to help us as a country prevent these dire predictions from happening.

FOOTNOTES

(1) Not enough information was available to assess the remaining 15 percent.

(2) Declaration of Environmental Policies and Procedures Relating to Economic Development adopted and signed at the UN, New York, February 1, 1980 by the African Development Bank, the Arab Development Bank for Economic Development in Africa, the Asian Development Bank, the Caribbean Development Bank, the Inter-American Development Bank, the World Bank, the Commission of European Communities, the Organization of American States, the UN Development Program, and the UN Environment Programme. Others subsequently signed.

(3) The total budget for 1981-83 is $8.2 million. The US share would only be about $500,000 toward a modest goal of only $1.5 million in direct pledges from government to the Caribbean Trust Fund. To date 25 countries have pledged contributions to the Fund, including France ($534,780 for 1982-83) and the UK partial pledge is $24,040 for 1982-83).

(4) In 1980 half of the funds designated for international organizations to implement the UNEP Fund program went to UNESCO (2.8 million), WHO (1.6 million) and FAO (1.5 million). Twenty international organizations were involved in implementing 145 projects totaling $11.8 million. See UNEP/GC.9/9, Section C and Table 6.

Table 2. List of world models

The Limits to Growth: produced at Massachussetts Institute of Technology in the United States of America, and sponsored by the Club of Rome. a/

Strategy for Survival: produced in the Federal Republic of Germany and the United States, and sponsored by the Club of Rome b/

The Latin American World Model: produced at the Bariloche Foundation in Argentina (the only major model to come from a developing country) c/

MOIRA (Model of International Relations in Agriculture): an agricultural model developed at the Free University of Amsterdam d/

SARU (Systems Analysis Research Unit) Model: developed at the United Kingdom Department of the Environment e/

United Nations World Input-Output Model: developed at Brandeis University for the United Nations f/

Interfutures: sponsored by OECD g/

Global 2000: prepared by the United States Government h/

For a review of these models in terms of their environmental, and resource components, see Biswas. i/

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a/ D.H. Meadows, D.L. Meadows, J. Randers and W.W. Behrens, *The Limits to Growth* (New York, Universe Books, 1972).

b/ M. Mesarovic and E. Pestel, *Mankind at the Turning Point* (New York, E.P. Dutton, Reader's Digest Press, 1974).

c/ A.O. Herrera *et al.*, *Catastrophe and New Society: a Latin American World Model*, SDRC, Ottawa. 1976.

d/ H. Linnemann, *MOIRA* (Amsterdam, North Holland Publishing Co., 1981).

e/ P. Roberts, "Systems Analysis Research Unit Models", in *Proc. 4th Symp. on Global Modelling* (Luxenburg, Austria, IIASA, 1976).

f/ W. Leontief *et al.*, *The Future of the World Economy* (New York, Oxford University Press, 1977).

g/ *Interfutures: Facing the Future, Mastering the Probable and Managing the Unpredictable* (Paris, OECD, 1979).

h/ *The Global 2000 Report to the President* (Washington D.C., Council on Env. Quality, 1980.

i/ A.K. Biswas, "World Models, Resources and the Environment", *Env. Cons* 6, 3-11, 1979.

Source: UNEP/GC(SSC)/2, 29 January 1982.

15. International action: law and assistance

1 Some living resources can be conserved only by international action. The principle of permanent sovereignty over natural resources together with recent extensions of national jurisdiction imply that the prime responsibility for conservation achievement lies at the national level. However, application of the principle is limited by the nature of many of the problems of conservation:

- many living resources are shared;
- many living resources occur (temporarily or permanently) in areas beyond national jurisdiction;
- living resources in one state may be affected by activities carried out in another.

Such resources can be conserved only by international action. International action is also necessary:

- to promote the conservation of genetic and other resources that are vital for the survival and wellbeing of all humanity;
- to stimulate and support national action.

2 It is recommended that cooperative programmes combining legislation, assistance and other actions be developed, concentrating on:

- tropical forests and drylands;
- the establishment of protected areas for the preservation of genetic resources;
- the global commons (the open ocean, the atmosphere, and Antarctica);
- regional strategies for international river basins and seas.

These programmes should provide an essential focus for international action on those issues for which it is indispensable, as well as for international support for national action to implement the World Conservation Strategy.

International law

3 Perhaps the most important form of international action is the development of international conservation law and of the means to implement it. Strong international conventions or agreements provide a legally binding means of ensuring the conservation of those living resources that cannot be conserved by national legislation alone. Because international conventions constitute a self-imposed restraint on each state's freedom of action, it is often difficult to conclude agreements of sufficient strength. Weak conventions, however, are dangerous and to be avoided, because they permit the illusion that problems are being tackled when in fact they are not.

4. Although there are more than 40 multilateral conventions directly dealing with the management of living resources, and although most have conservation components, few have conservation as their primary purpose[1]. All international agreements relevant to living resources need to be reviewed to identify the most significant gaps in coverage, indicating whether each gap would best be filled by a global or a regional approach. The review should examine:

- *those conventions dealing directly with the management of living resources*, to determine whether they provide sufficiently for conservation;
- *those conventions whose primary purpose is conservation*, to determine whether they achieve the intended objectives and if not what measures are necessary to enable them to do so; preliminary suggestions with respect to the four main global conservation conventions (see box) follow.

Wetlands Convention

5. The Wetlands Convention at present lacks force, requiring only that states select at least one wetland for conservation, but not providing criteria to guide selection, guidelines for management, or adequate safeguards against delisting a wetland once selected. Experience has shown that an international convention must have a secretariat and a financial mechanism to be effective, but the Wetlands Convention lacks both. The convention could if it were revised become an important force for the protection of coastal and other wetlands essential for supporting fisheries (as well as for supporting waterfowl, which is the chief concern of the convention at present); but in either case criteria for selection of wetlands and clear obligations on states for their conservation are essential.

World Heritage Convention

6. This convention recognizes the obligation of all nations to protect those unique natural and cultural areas which are of such international value that they are part of the heritage of all mankind; and the corresponding obligation of the international community to help them. It is important not only that states become party to the World Heritage Convention but also that they contribute generously to the World Heritage Fund. The Fund does not diminish the responsibility of each state to protect its unique natural areas, but it does provide a means of ensuring that areas of global significance are not lost because of a local lack of money or skills.

CITES

7. This convention has considerable potential, the key to which is its network of national management authorities and scientific authorities operating in direct communication with each other and the secretariat. The management authority is concerned with the mechanics of trade (such as permits); the scientific authority is concerned with the biological aspects and must therefore satisfy itself that the issuance of an import or export permit will not have a harmful effect on the species concerned. Developing countries often lack the personnel and financial resources to establish and maintain fully operational agencies for this purpose. Multilateral and bilateral development assistance agencies are recommended to provide assistance on request and to assist exchange of administrative and scientific experience among trading countries.

8. To make full use of the regulatory network established by CITES, certain improvements in its international standard-setting and national enforcement mechanisms are needed. At present, marine fishes, molluscs and crustaceans are inadequately represented in the CITES Appendices, and a further review of these groups is necessary. In addition, the administration of CITES at the national level needs to be linked much more closely with the existing customs, veterinary and phytosanitary inspection systems. Rather than inventing new bureaucracies, optimum use should be made of the available ones. Exploitation levels, trade, and response to regulations should be closely monitored, not only by governments but also by non-governmental conservation organizations. Conservation organizations should monitor the implementation of

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Notes and references

[1] In addition to the four global conservation conventions described in the text, there are several regional agreements, notably the African Convention on the Conservation of Nature and Natural Resources, the Convention on Nature Protection and Wild Life Preservation in the Western Hemisphere, the Convention on Conservation of Nature in the South Pacific, and the Convention on the Conservation of European Wildlife and Natural Habitats.

[2] There are several regional and bilateral agreements covering migratory species, notably: the Agreement on Conservation of Polar Bears; the US-USSR Agreement on Migratory Species; the Convention for the Protection of Migratory Birds between Canada and USA, later supplemented by a similar treaty be-

CITES by their national (scientific and management) authorities. They should monitor trading in shops and through newspaper and other advertisements; and they should ensure that the annual reports and any proposals submitted by national authorities to the CITES secretariat properly reflect conditions, informing the CITES secretariat should this not be the case. Conservation organizations with monitoring experience could provide a useful service to other organizations by helping them to set up their own monitoring systems.

Migratory Species Convention

9. Migratory species, as defined by the Migratory Species Convention, are "the entire population of any species or lower taxon [such as a subspecies] of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries". The Migratory Species Convention obliges parties to protect endangered migratory species and to endeavour to conclude agreements for the conservation of migratory species whose status is "unfavourable". Existing regional and bilateral agreements on migratory species[2] have demonstrated that international conventions are the only effective means of protecting animals that cross national boundaries. The Migratory Species Convention, which is potentially a strong one, is therefore of great importance. Governments should join the convention without delay and national and international organizations should assist them to implement it.

Development of new law

10. Because of their force, strong international agreements are very important for the implementation of the World Conservation Strategy. The more effective conventions need the constant, vigorous support of governments, non-governmental organizations, and international organizations; and the weaker ones need strengthening. Action should not be restricted to conventions, however. Attention should also be paid to some of the other ways in which international law develops: for example, the exploration of new concepts such as the application of environmental assessment procedures at the international level; and the elaboration of "soft law" such as the Declaration of the United Nations Conference on the Human Environment. Although soft law is unenforceable it is of great value because it provides a set of generally agreed standards of international behaviour and paves the way for the codification of such standards in a more binding form.

International assistance

11. The funds spent by multilateral and bilateral development assistance agencies (more than $27,000 million in 1976)[3] can do a great deal towards restoring the environment, tackling environmentally induced poverty, and enabling countries to make the best use of their resources, if the projects they support are environmentally sound. It is recommended that such agencies make every effort to:

- direct funds to reforestation, the restoration of degraded environments, and the protection of watersheds, of mangroves and other critical habitats for marine resources, and of genetic resources essential for development;
- assess all projects for their ecological implications and ensure that they are ecologically sound;
- assist governments to design ecologically appropriate policies and to establish and maintain effective conservation infrastructures.

12. Assistance should be made available to enable requesting nations to develop the capacity to carry out national conservation strategies, ecosystem evaluations and environmental assessments, and to implement cross-sectoral conservation policies through appropriate legislation, training and organization. Development agencies should assist governments on request to establish the laws, institutions and procedures to enable them to conserve their country's living resources. Developing industries based wholly or partly on living resources should be encouraged and equipped to ensure that the resources are exploited sustainably and that the genetic diversity on which ultimately they depend is preserved. Development assistance agencies have a special responsibility to help—through the provision of appropriate advice and technical assistance—the recipient nation ensure that financial assistance makes the best use of the living resources it is likely to affect, and should endeavour to ensure that:

- the proposed development is compatible with the recipient country's national conservation policy and strategy (if they exist);
- the proposed development is the most appropriate response to the capabilities of the ecosystems concerned;
- an environmental assessment is carried out.

13. Nations lacking the capacity to prepare or carry out national conservation strategies, ecosystem evaluations or environmental assessments or lacking adequate conservation laws, means of enforcing them, or organizations to effect the full range of required conservation measures, should seek appropriate multilateral or bilateral assistance.

How to join the four global conservation conventions

Membership in international conventions requires the deposit of appropriate diplomatic instruments (signed by the head of state or government, or by the minister in charge of foreign affairs) with the designated Depositary of the Convention.

1. *Convention on Wetlands of International Importance, Especially as Waterfowl Habitat* (Wetlands Convention)
(concluded at Ramsar, 2 February 1971)
Depositary: Director General of Unesco, Paris
Instruments: a. signature without reservation as to ratification; b. signature subject to ratification, followed by ratification; or c. accession.

2. *Convention Concerning the Protection of the World Cultural and Natural Heritage* (World Heritage Convention)
(concluded at Paris, 23 November 1972)
Depositary: Director General of Unesco, Paris
Instruments: a. ratification or acceptance (by Unesco members); or b. accession (by all other states).

3. *Convention on International Trade in Endangered Species of Wild Fauna and Flora* (CITES)
(concluded at Washington, 3 March 1973)
Depositary: Federal Department for Foreign Affairs of the Swiss Confederation, Bern
Instruments: a. ratification, acceptance or approval (by states having signed before 31 December 1974); or b. accession (by all other states).

4. *Convention on Conservation of Migratory Species of Wild Animals* (Migratory Species Convention)
(concluded at Bonn, 23 June 1979)
Depositary: Foreign Office of the Federal Republic of Germany, Bonn
Instruments: a. signature (until 22 June 1980), followed by ratification, acceptance or approval; or b. accession.

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tween the United States and Mexico; the US-Japan Convention for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment; and the Japan-Australia Convention for the Protection of Migratory Birds.

3. Stein, Robert E., and Brian Johnson. 1979. *Banking on the biosphere? Environmental procedures and practices of nine multilateral development agencies.* Lexington Books, Lexington.

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Appendix C

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Table 1: World Per Capita Production of Basic Commodities, 1950-1981, With Peak Year Underlined

Year	Wood	Fish	Beef	Grain	Oil
	(cubic meters)	(kilograms)	(kilograms)	(kilograms)	(barrels)
1950	—	8.4	—	251	1.5
1955	—	10.5	—	264	2.0
1960	—	13.2	9.3	285	2.5
1961	.66	14.0	9.6	273	2.7
1962	.65	14.9	9.8	288	2.8
1963	.66	14.7	10.7	282	3.0
1964	.67	16.1	10.1	292	3.1
1965	.66	16.0	9.9	284	3.3
1966	.66	16.8	10.2	304	3.5
1967	.64	17.4	10.4	303	3.7
1968	.64	18.0	10.7	313	4.0
1969	.64	17.4	10.7	311	4.2
1970	.64	18.5	10.6	309	4.5
1971	.64	18.3	10.4	330	4.7
1972	.63	16.8	10.6	314	4.9
1973	.64	16.8	10.5	332	5.3
1974	.63	17.7	11.0	317	5.2
1975	.61	17.2	11.3	316	4.8
1976	.62	17.7	11.6	337	5.1
1977	.61	17.3	11.5	330	5.2
1978	.61	17.3	11.4	351	5.2
1979	.60	16.9	10.9	331	5.3
1980	.60	16.1	10.5	324	4.9
1981 (prel.)	—	—	10.4	331	4.5

Source: Food and Agriculture Organization, U.S. Departments of Agriculture and Energy, and U.N. Demographic Division.

From "Six Steps to a Sustainable Society," by Lester R. Brown and Pamela Shaw. Worldwatch Paper 48 (March 1982).

Appendix U

The United Nations and the Environment: After Three Decades of Concern, Progress Is Still Slow

A Special Report by Patricia Scharlin, Sierra Club International Earthcare Center, New York, NY

A review of UN activities in the field of the human environment during the last 35 years demonstrates once again that the more things change the more they remain the same. One can easily argue that maintaining a viable and healthy planet has been a major goal of the UN system since its inception. Although the term "human environment" was not used in UN circles until the 1972 conference in Stockholm, the matters with which that conference was concerned had been the subject of other conferences and international scientific meetings as early as 1949, when the first UN Conference on the Conservation and Utilization of Resources was held at Lake Success, prepared and organized with the assistance of the International Union for Conservation of Nature (IUCN).

The fragility of the earth's biosphere—the narrow surface of land and air that supports life—was highlighted at a UNESCO-sponsored conference in 1961 and gave rise to a program within UNESCO of interdisciplinary scientific research called Man and the Biosphere. More than a decade earlier, in 1948, international concern for the environment had led to the formation of the IUCN, with assistance from UNESCO (1). An international non-governmental organization with a complex membership including sovereign states, government agencies, and national and international non-governmental organizations, the IUCN has focussed on conservation of species and habitat, and on other global projects. In addition to UNEP, FAO and UNESCO, and more recently The World Meteorological Organization (WMO) and The World Health Organization (WHO) are the main UN bodies concerned with enhancing the human environment. But other organizations are becoming involved in the process of planetary management, and nearly every agency and body of the UN concerned with development now has an environmental office.

THE ENVIRONMENTAL MOVEMENT

The environmental movement, encompassing pollution problems as well as resource conservation, took root in the industrialized world in the 1960's when those countries began to realize that industrial "progress" brought with it increased air and water pollution, industrial wastes, noise, and loss of living and nonliving natural resources. The need for international cooperation became apparent when nations began to face environmental problems which extended beyond national borders. An underlying concern was fear of losing access to resources controlled by the newly independent nations—a concern reinforced by the UN declaration on "Permanent Sovereignty over Natural Resources" and the strong nationalism of a number of developing countries (2).

In 1968, at the initiative of Sweden, the General Assembly decided to hold a Conference on the Human Environment in Stockholm, June 5–16, 1972. The central theme came out of the realization that we live on "Only one Earth." As expressed by Secretary-General U Thant at the time, "Like it or not, we are all travelling together on a common planet. We have no rational alternative but to work together to make it an environment in which we and our children can live full and peaceful lives. To produce at any cost, without due consideration of effects on the environment, can no longer be the central preoccupation of man."

In the Declaration of Principles, formulated at the Conference, the governments asserted that man has the right to freedom, equality and adequate conditions of life. This both reinforced and strengthened commitment to the United Nations Charter and Universal Human Rights Declaration. Natural resources were to be safeguarded for the benefit of present and future generations; the capacity of the earth to produce renewable resources was to be maintained; and non-renewable resources were to be managed so as to guard against their exhaustion. Pollution of the oceans from ship- and land-based sources was to be prevented and the "heritage of wildlife and habitat" protected. Economic and social development was deemed "essential for ensuring a favorable living and working environment" and for the improvement of the "quality of life".

The Declaration called for an integrated approach to development which would include the environmental consequences. While asserting that states had the sovereign right to exploit their own resources, the Declaration affirmed that states had the "responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or areas beyond the limits of national jurisdiction."

UNEP AS CATALYST

The United Nations Environment Program, established by the General Assembly in 1972, was to serve as a small facilitating body within the UN framework in addressing the environmental priorities laid out in the Action Plan developed at Stockholm. These prior ties encompassed the environmental concerns of both developed and developing nations, and ranged from human settlement, health and well-being to management of resources, control of pollution and protection of species (see Figure 1).

In the period prior to the Stockholm Conference there was never government support for establishing a separate environmental organization within the UN system. Instead, the plan supported by the Conference Secretary-General, Maurice F Strong, was to have a small, high-level secretariat with an environmental fund which could be used to stimulate the insertion of environmental concerns in the programs of national, regional and international institutions. As the first Executive Director of UNEP, Maurice Strong did much to shape this UNEP role as "catalyst" and "coordinator".

But a major consequence of this decision has been UNEP's inability to assert much influence over the policies and programs of the large and well-entrenched specialized agencies, which from the beginning of the Conference preparations have protected their own fields of interest. This fact, combined with limited funds and a program so broad that there can be no concentration on solving a few critical problems, has produced a great deal of criticism about the effectiveness of UNEP.

The ailments of UNEP are not unlike those of the UN system as a whole. With a Governing Council of 58 member states selected through the customary UN formula of adequate geographical and political representation, UNEP is subject to the same political and economic pressures as other intergovernmental bodies. From the

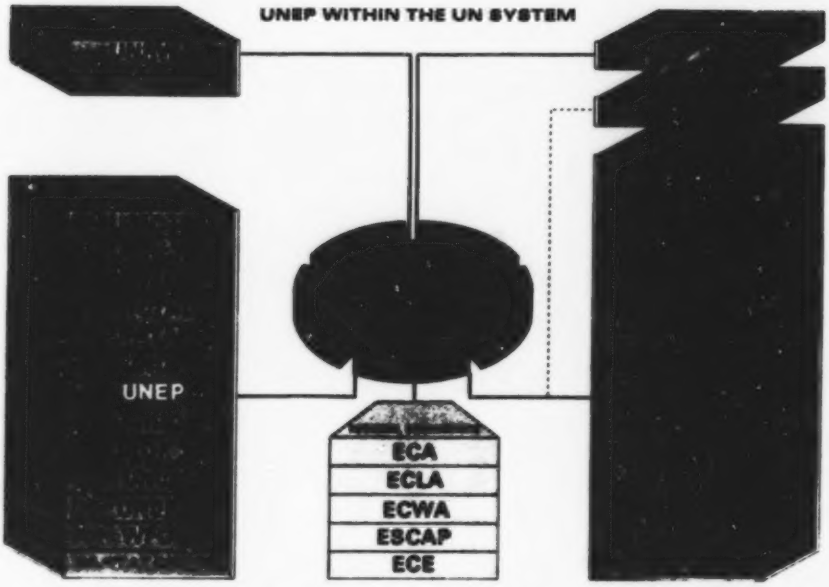

Figure 1. The United Nations Environment Program shown within the UN system. UNEP reports annually to the UN General Assembly through the Economic and Social Council (ECOSOC). Source: UNEP.

very beginning, UNEP has had to walk the fine line of satisfying the demands of the Third World for projects more closely related to their national needs, and the demands of the developed nations which believe the UNEP program should address problems with global implications. At each Governing Council session the actions of the previous year are reviewed and new topics are inevitably added to the list for action.

There has been perceptible improvement in the relationships among the UN agencies, probably as a result of the Administrative Coordination Committee, which provides a mechanism for regular consultations. To this end all the agencies with projects affecting the environment have a designated UNEP contact or "focal point." However, these agencies are not yet structurally equipped to integrate environmental aspects into their development projects and program activities. For example, FAO has set up an Environment Program Coordinating Unit, to facilitate cooperation with UNEP and other agencies, and has an environmental program devoted to assessment and management of natural resources for food and agriculture, and control of related problems of pollution. To encourage the agencies throughout the UN system to work toward greater integration, UNEP conducts bilateral meetings with many of the agencies, which are now participating in a medium-term, environmental program to co-ordinate planning over six-year periods, the first covering the period 1984–89.

There are two areas in which it has been suggested that UNEP is particularly able to provide special leadership. First, its role in monitoring and encouraging the formulation of global policy with respect to the earth's "outer limits"—that is, the capacity of the atmosphere to absorb high levels of man-made carbon dioxide, the effect of pollutants on the ozone layer, ocean quality and the quality of food and water. Second, UNEP can stimulate the development of an environmental infrastructure at the national level and encourage the upgrading of environmental considerations in the programs of international institutions. It can also help developing countries to strengthen their capacity for environmental assessment in the development process. Concentrating its energies on the development of techniques and abilities for environmental management may reduce confrontation with the other specialized agencies which argue that they have been doing "environmental work" for years (3).

Through the "Earthwatch Program," initiated at the Stockholm Conference, UNEP was given responsibility for setting up a Global Environmental Monitoring System (GEMS) to collect data on pollution and land and ocean changes (see Figure 2). The technical, political, and financial problems inherent in such an ambitious effort severely limited the initial operations, but data are now becoming available, in particular on the state of the world forest cover. Collecting and transmitting information through an international network entitled INFOTERRA has proved equally difficult. Some 150 "focal points" have now been set up around the world, drawing on 9 000 sources; however, they have not been well utilized to date.

ENVIRONMENT IN THE UN SYSTEM TODAY

The Stockholm Conference and Action Plan spearheaded a process that is still at an early stage. But after a decade, one can see certain positive changes. Environment is no longer a confrontational word opposed to development, and environmental considerations are included in most major international decisions relating to resource management.

In the last decade the number of international agreements on global resource management and regulation of pollution has grown, the most notable of these being the draft Law of the Sea Treaty. In Article 65 of the current negotiating text, for example, international recognition is given to the need for stringent standards to conserve marine mammals within the 200-mile economic zones. Another article (article 165) relates to environmental protection

provisions governing the deep seabed mining of manganese nodules. Another significant resource agreement, the recently-signed Convention on the Conservation of Antarctic Marine Living Resources, contains a key article which provides for an "ecosystem" approach to the harvesting of the living resources (4).

Earlier international action focused on problems of marine pollution and its effect on ocean resources. More recent action on marine pollution has taken place at the regional level. Shortly after the Stockholm Conference the Baltic States signed a convention to control pollution of the sea from land-based sources, and agreements among the countries bordering the North Sea help to regulate offshore oil exploitation and shipping. In 1975 and 1976 UNEP played a central role in obtaining agreement on a convention and series of protocols and an action program for controlling pollution of the Mediterranean Sea. The Barcelona Conference for the Protection of the Mediterranean Sea Against Pollution and the two protocols (for the Prevention of Pollution of the Mediterranean Sea by Dumping from Ships and Aircraft, and Concerning Cooperation in Combatting Pollution of the Mediterranean Sea by Oil and Other Harmful Substances in Cases of Emergency) have been ratified by 17 states and the EEC. Agreement on a key third protocol on land-based sources of pollution was signed in Athens in May 1980, and a fourth on endangered species and their habitats is likely to be signed in early April. The riparian states have set up a secretariat to implement the Mediterranean Action plan, and an Oil Combat Center in Malta serves as an information exchange "switchboard" on oil spills. A similar pattern for cooperation among riparian states has been developed in other regional seas including the Persian Gulf, the Caribbean, along the west coast of Africa, the west coast of South America, and most recently, the East Asian seas. The program now involves 120 nations and covers 10 seas.

The problem of toxic chemicals has also elicited an increasing degree of international cooperation. UNEP, in cooperation with WHO, has established an International Register of Potentially Toxic Chemicals (see p 67 this issue). After a slow start, it has begun to provide information regularly to governments to help determine the conditions under which the chemicals should be used.

There has also been some success in including environmental assessment procedures into development grants by major international financing organizations. The World Bank was the first of the international lending agencies to set up an environmental review procedure for projects, and that procedure is increasingly being incorporated into the planning phase, instead of being an "add-on" item included after the project is well underway. The World Bank is one of 10 major development institutions which, with the encouragement of UNEP, recently signed a Declaration of Environmental Policies and Procedures Relating to Economic Development (5). It is designed to build "appropriate environmental measures" into development projects, and to provide technical assistance on environmental matters to developing countries.

Not all of the efforts to link development with sound environmental planning have been as successful. For example, United Nations development assistance through the UN Development Program (UNDP) could have a major effect in protecting the environment. UNDP's 1980 budget of about $845 million (6) is substantially higher than UNEP's budget of $30—$35 million annually, which gives UNDP considerably more clout than UNEP. In addition, much of the UNDP program is focused on development of forest and ocean resources, especially fisheries, water and energy resources. But recent evaluations of UNDP activities indicate that little attention is paid to the impact of these activities on the environment (7), despite UNDP's acceptance of the Declaration of Environmental Policies mentioned above.

THE NEXT 35 YEARS

Recent studies projecting the future state of the earth and the needs of its inhabitants have concentrated on the two pronged problem of burgeoning population and consumption of the resource base. The predictions are perhaps more dire than they were 35 years ago, but little has changed except that the problems may have come into sharper focus. In a recent study, *The Global 2000 Report*, it is projected that if trends continue at the current level, the world's population will increase in the next 20 years by 46 percent to 6.35 billion persons. An annual population growth rate of approximately 1.7 percent means that 100 million people will be added to the world's population every year—with 90 percent of the growth occurring in the developing countries, especially in urban areas (8).

The energy picture is more complex, but without doubt fuel needs beyond 2000 will continue to be linked to economic growth, and price increases for energy from all sources will be substantial. By 1994 FAO predicts an annual shortfall of 650 million cubic meters of fuelwood, and an increase in the use of dung and crop residues, which in turn will seriously affect agricultural output. By 2020 nearly all accessible forests in the Third World will have been cut. Although food production is expected to expand, this will only be possible by using increased amounts of energy and sophisticated technology resulting in price increases of almost 200 percent. Moreover, the increased supplies of food will not be available uniformly throughout the world. Consumption of minerals will rise to the extent that several minerals, including nickel, may be exhausted in 35 years. A major constraint affecting all development will be the availability of water, especially in areas of high population growth and severe deforestation. The genetic resources of the planet are decreasing at such an alarming rate that about one-fifth of the known plants and animal species existing today will be lost within 20 years, either by overexploitation or habitat destruction. Acid rain caused by use of fossil fuels will damage lakes, soils and crops primarily in the industrialized countries, and increased concentration of carbon dioxide and other chemicals affecting the ozone layer may alter the global climate by 2050, severely affecting agriculture.

That discouraging prospect should be combined with economic and social projections set forth by the United Nations, the World Bank and most recently by the Brandt Commission Report, *North-South: A Program for Survival* (9). The World Bank has been fairly optimistic about economic growth in the Third World but still expects 600 million "absolute poor" in countries of the South by 2000. Based on an annual growth rate in gross domestic product of 6.5 percent, the UN Conference on Trade and Development (UNCTAD) estimated that the total financing needs of the "least developed" countries will be $21 billion per year for the 1990's.

In the medium term, assistance for agricultural development will be needed in the amount of $8 billion a year up to 1990, along with additional investment by the recipient countries. In a special study for the Brandt Commission, the International Food Policy Research Institute (IFPRI) indicated that to overcome projected food deficits in the poorer countries would require $13 billion annually, assuming that half the costs would be met by the countries themselves (10).

The international community will address these economic and environmental problems in the Third UN Development Decade. In elaborating a new "International Development Strategy" ("development without destruction" is one of the current slogans), the objective will be to provide greater equity between the rich and poor nations, establish a more stable world economy with full and equitable participation by all countries, stimulate economic growth in the poorer countries, and reduce the worst forms of poverty. But to achieve equitable and sustainable development will require major institutional changes at every level and above all a change in public policy and attitudes.

One effort to alter existing institutions and move the world toward a concept of global resource management is the World Conservation Strategy (WCS) prepared by the IUCN with the advice, cooperation and financial assistance of UNEP and the World Wildlife Fund, and in collaboration with FAO and UNESCO. It represents a major effort to help governments and international organizations build ecologically sound management concepts into national, regional and international development plans. It is also designed to be incorporated into the International Development Strategy.

The aim of the WCS is threefold: to maintain essential ecological processes and life support systems, to preserve genetic diversity, and to ensure sustainable utilization of species and ecosystems. The Strategy has identified certain areas requiring specific international action, including: 1) a review and assessment of international law relating to living resources and the development of new laws where there are deficiencies; 2) implementation of international conservation conventions and conventions on ocean and atmospheric pollution; 3) increased multilateral and bilateral assistance to countries to help restore or improve degraded environments and to design environmental policies and institutions; 4) cooperative programs for conservation of tropical forests and dry land areas and for protecting species habitat; 5) support for the recently initiated World Climate Program; and 6) development of regional plans for conservation of living resources of international river basins and of international seas.

CONCLUSION

From the above it is clear that global processes and institutions are moving slowly toward understanding the need for protecting the environment of the planet. But it is also apparent that progress is too slow. Faster and more concrete action is called for if we are to mitigate the forces that are altering the earth's life support systems. UNEP, the main UN body concerned with environmental protection, is not able to be effective with its limited funds, given the vast range of issues it must confront. One suggestion is that UNEP should focus more directly on the global monitoring role it was initially supposed to perform, and more actively infuse environmental considerations into UN development projects.

Training, education and information dissemination about the environmental implications of development and resource management have been seriously neglected by the UN agencies. Without a better-informed public and without more trained development planners and policy makers there is little hope that the degrading global processes described above can be altered. A strong and determined UN community working together to solve the problems of poverty and ecological degradation is essential (11).

AMBIO VOL. 11 NO. 1, pp. 26-29.
AMBIO, 1982

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10. *Ibid* p. 93.
11. This special report was adapted from an article prepared for the Commission to Study the Organization of Peace for a commemorative volume on the United Nations.

Mr. **Bonker**. Thank you, Mr. Robinson, for excellent testimony.

The last witness will be Thomas Stoel, president of the Global Tomorrow Coalition.

STATEMENT OF THOMAS B. STOEL, JR., DIRECTOR, INTERNATIONAL PROGRAM, NATURAL RESOURCES DEFENSE COUNCIL, PRESIDENT, GLOBAL TOMORROW COALITION

Mr. **Stoel**. Thank you, Mr. Chairman.

I would like to point out that I am director of the International Program at the Natural Resources Defense Council as well as president of the Coalition. Although each of the Global Coalition's 56 members are very interested in the subject of this hearing, I will formally be representing the Coalition only in part of my testimony on forecasting and foresight capability.

I have submitted a lengthy prepared statement and I request that it be included in the record.

Mr. **Bonker**. It will be.

Mr. **Stoel**. I will summarize very briefly.

I make several basic points, and they are remarkably similar to the ones in your opening statement, so I guess we have learned the same things from these hearings.

One point is that global population, resource, and environmental development during the 1970's had very significant impacts on the welfare of the United States, as well as that of other countries and on the global commons.

I think that as Erik Eckholm, one of the leading experts, predicts these effects are going to be more substantial in the 1980's. We just can't afford to ignore these problems. Fortunately, we mainly know how to deal with them. Although the responses will be complex and difficult, the chief obstacles are not technical but a lack of political will.

Leadership from the United States can play a very important part. The present administration is on the verge of allowing the United States to lose its leadership position, a point to which I will return in a minute.

Mr. **Bonker**. You say we have lost our leadership position. I don't disagree with the statement, but who else is emerging as a leader in this field, who is assuming that leadership position?

Mr. **Stoel**. That is a very interesting point. I think what is going to happen if we lose our leadership position is that there won't be a single leader, but individual nations, other nations will emerge in particular areas.

For example, I was very interested to learn from one of my colleagues, Karim Ahmed, a nongovernmental representative on the OECD experts group on harmonization of toxic chemicals, when he returned from Paris a few weeks ago after a meeting on this subject, that there was a consensus among the experts from different nations that over the last couple of years the Japanese had emerged as the leaders on how to regulate toxic chemicals. They were thought to have passed both us and the Europeans in this area.

So I don't think there will be a lack of people to assert some sort of leadership. In many cases, where there is commercial significance, this will be not only to the detriment of the environment but to the detriment of our economic position if others know better how to regulate. If we are lagging back and refusing to cooperate, we are going to be left out of important markets and develop a bad reputation in the world.

I say in my testimony that international organizations have a very important role to play, because you can solve very few of these problems without some international cooperation. The United States should step up its support for these organizations, including UNEP, which has achieved a lot in its brief existence.

My final point in the prepared statement is that accurate forecasts of future conditions are necessary both to arouse public awareness and to develop answers to these problems. International organizations, nongovernmental organizations, and national governments all must be involved. National governments, however, must provide most of the resources, and again the United States should be a leader.

In view of Mr. Funkhouser's testimony, I will make a few points about U.S. leadership and forcasting, two points that he focused on.

With respect to the administration's accomplishments to date, I would say only that the accomplishments cited by Mr. Funkhouser are not apparent to me, or to most other observers of the administration, after the administration has been in office for some 15 months. I think, as noted by some of the other witnesses, that the administration does deserve credit for initiatives by the Agency for International Development and for the Biological Diversity Conference sponsored by the State Department last fall. But particularly on issues within EPA's jurisdiction and especially those having to do with chemicals, I think the record has been, despite Mr. Funkhouser's testimony, negative.

In harmonization of regulation of toxic chemicals, in regulation of toxic exports and notifications, and in combating the ozone depletion problem, the United States now has lost its leadership position. We would have to regain it.

Another negative signal, was the cut in the UNEP budget which was disproportionate to the cut which we all recognize unfortunately had to occur in the budgets of other international organizations. As you pointed out, it first started out at the ridiculous level of zero, which would have effectively meant that the United States was pulling out of UNEP.

Mr. **Bonker**. Let me say in the 4 years I have chaired this subcommittee I have not seen a lot of support coming from the environmental community in our efforts to keep money in UNEP. I don't know whether it's a lack of information or priorities. But every year we face this problem with the State Department recommending reductions in UNEP, and there are a lot of members of the committee and Congress who are sensitive to the environmental community, but I have not seen a lot of support in the past.

So, I am glad to see references made now to your commitment for funding. When we get into the budget crunch, which is apparently going to be with us for some time, we may not be going on the basis of what we did last time; that is, to preserve all of the voluntary contributions to international organizations with percentage reductions. I hope next time you are poised to support us down the line when we need it.

Mr. STOEL. I appreciate that, Mr. Chairman. Some organizations including my own, have lobbied on this issue, but I see we need to step up our efforts to make the impact needed. I agree it has to be done, including this year.

I want to mention the OECD report, since Mr. Funkhouser defended himself at such length. I think the significance of this is not the report itself but the fact that Mr. Funkhouser has created such a flap within the administration and in the international community over this report, which is simply a set of working papers. The cover document that went to the governments said, "It should be stressed that these papers remain active as working papers." And then, "These consultations will continue and the papers would remain open to modification."

I think that in the memo you quoted it was quite clear that the administration was trying to send a signal, a political signal, rather than simply to criticize the papers on technical grounds, which was quite warranted.

I wonder whether you are going to include that memo in the record of the hearings? If not, I would like to submit it because I think it is important.

Mr. BONKER. The Chairman has made several references to the memo, so, without objection, we will have the relevant sections included in the record.[1]

Mr. STOEL. I would point out that the little note at the end of the memo from Mr. Funkhouser to Mrs. Gorsuch says: "This first draft will never see the light of day, but it may serve to provoke thought on where this administration stands environmentally. A message must go out. This is an easy opportunity." So I think it's quite clear that they were trying to send a signal as well as to register some technical objections.

I finally would say that I agree very much with Erik Eckholm's comments about Mr. Funkhouser's rhetoric concerning the role of the free market. There is no question that the market has a role, but Mr. Funkhouser made it clear where he stands in his strange statement that the free market solved or helped to solve the problem of air pollution by encouraging a shift from coal to oil.

Now it's true that that happened. But right now we are seeing that the market is encouraging a shift back to coal. Even the most ardent free marketeers, like the Chicago economist Milton Friedman, admit the free market can't solve these problems by itself. It's a defect in the market system that has to be corrected by government, and that every responsible observer agrees with respect to problems like air pollution.

I believe that Mr. Funkhouser represents only a relatively small ideological faction in the administration. I was glad to hear him say that the United States intends to continue its leadership role. I was encouraged, by the testimony you heard on March 31 from other spokesmen for the administration.

The administration may be ready to get its act together and to overcome the ideologically based objections of a few. I certainly hope that is true, and those of us in the part of the private sector stand ready to cooperate with the administration.

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[1] See appendix 15.

I would add a few words about forecasting, because that also has been alluded to. There has been much controversy about Global 2000, but I think the main significance of Global 2000 is what it revealed about the U.S.-forecasting capability: namely, that it has a lot of deficiencies.

I think everybody agrees on this. Mr. Funkhouser agreed. It seems to me that the thing to do is to move ahead and correct those deficiencies.

I have specific suggestions in my statement. I do not suggest a detailed, overall review of the Global 2000 projections per se. That report admitted it had serious defects, and to try to correct them with present methods and present data in the next 6 months or so would be an exercise in futility. We should get to the basis of these deficiencies.

If a review were to be undertaken, I think that Herman Kahn and Julian Simon, who have already published long articles critical of the Global 2000 report, would be very poor choices of people to whom the U.S. Government should pay substantial amounts of money for another review.

Mr. **Bonker**. Especially if they already have done their critiques and they are available. Why should we have the taxpayers pay for the cost of the report?

Mr. **Stoel**. Exactly. They have already published.

Mr. **Bonker**. They would just recycle it and charge the Government $50,000.

Mr. **Stoel**. I could not agree with you more, Mr. Chairman. I would add that we at the Global Tomorrow Coalition, who are focusing especially on this issue, would welcome dialog with the administration about the best way of accomplishing the objective of giving the United States a better forecasting capability. We look forward to doing that, assuming the administration moves ahead in a responsible way.

Thank you, Mr. Chairman.

[Mr. Stoel's prepared statement follows:]

PREPARED STATEMENT OF THOMAS B. STOEL, JR., DIRECTOR, INTERNATIONAL PROGRAM, NATURAL RESOURCES DEFENSE COUNCIL, AND PRESIDENT, GLOBAL TOMORROW COALITION

Mr. Chairman, I am Thomas B. Stoel, Jr., Director of the International Program of the Natural Resources Defense Council (NRDC) and President of the Global Tomorrow Coalition. NRDC is a national environmental protection organization with about 35,000 members. The Global Tomorrow Coalition is a coalition of 56 nongovernmental organizations concerned about global population, resource, and environmental problems. Although every member of the Coalition is interested in the subject of these hearings, I will represent the Coalition only in part of my testimony on foresight capacity.

My testimony focusses on the principal environmental issues the world will face in the 1980s and beyond. It is organized under two broad headings:

(1) Global environmental trends and their significance.

(2) Responding to global environmental problems.

I will make several basic points. Global population, resource, and environmental developments during the 1970s had significant impacts on U.S. economic welfare. During the 1980s, these effects are likely to be more substantial.

We mainly know how to deal with these problems, though responses will be complex and difficult. The chief obstacle is a lack of political will. Leadership from the United States can play an important part, but the present Administration is in danger of allowing the United States to lose its leadership position.

International organizations must play essential roles, for most of these problems will not be resolved without international cooperation. The United States should step up its support for these organizations, including the United Nations Environment Programme (UNEP), which has achieved much in its brief existence.

Accurate forecasts of future conditions are necessary both to arouse public awareness about these problems and to develop appropriate answers. International organizations, nongovernmental organizations, and national governments all must be involved in forecasting. National governments must provide most of the resources. Again, the United States should be a leader.

I. Environmental Trends and Their Significance

You heard testimony on April 1 from a number of experts on the trends and outlook generally and in specific areas. An excellent overview is contained in the background document prepared by UNEP for its upcoming Session of Special Character, entitled

"The Environment in 1982: Retrospect and Prospect;" in other documents sponsored by UNEP; in the United States Government's Global 2000 Report; and in the World Conservation Strategy produced by the International Union for Conservation of Nature (IUCN). Therefore, my comments will be brief.

A. Population

The 1980 Census estimated the population of the United States at 226.5 million. If both immigration and birth rates remain at their current levels, the U.S. population in the year 2000 will be about 266 million, an increase of 17%. Of the 39.5 million new inhabitants, 17.5 million will result from natural growth of the present population, 12 million from legal immigration, and 10 million from illegal immigration.

The population of the industrialized nations of the world (including the United States) is about 1022 million. It is projected by the World Bank to rise to about 1154 million (+13%) by 2000.

The population of the developing nations is about 3271 million. The World Bank projects it to rise to 4889 million (+49%) by 2000.

The population of the world (the sum of the last two categories), now about 4293 million, would thus reach about 6043 million (+41%) by 2000, only 18 years from now. The great bulk of the increase in world population during the next two decades will occur in the developing countries. Population increase, by itself, should not cause intolerable harm to the environment in the United States and other developed countries, though there will be substantial impacts.

However, in many developing nations, where millions already are on the margin of survival, the pressure placed by increased populations on croplands, grazing lands, forests, and fisheries seems sure to cause massive environmental degradation, a subject I will discuss a little later.

B. Resources

The key question with respect to resources is what rate of growth in consumption can be sustained. The best indicator of sustainability is the rate of growth in *per capita* consumption which can be maintained, since it is the amount of a resource available to each person which matters.

It is obvious that there *are* limits to growth. No one of sound mind would contend, for example, that the real U.S. gross national product could quadruple in one year. It is equally obvious that few, if any, limits are absolute, at least in terms of satisfying human needs. If horses are slow, we invent cars. If vacuum tubes are bulky, we invent transistors. Over any particular time period, the important question is: What will be the balance between technological improvements, population growth, stresses on ecological systems, and depletion of nonrenewable resources The argument of Professor Julian Simon and others that we need not worry about population, resource, and environmental contraints because technology is *sure* to overcome them is, presumptively, no more valid than the claim of others that we must move quickly to a "no-growth" or "steady-state" society because technology *cannot possibly* overcome them. The only way to make a judgment on the issue is by close analysis of the best available data.

Unfortunately, the most careful analysis that I know of indicates that the news about sustainability is not good. According to Lester Brown, President of the Worldwatch Institute, the world's *per capita* production of oil levelled off about 1973, when OPEC quadrupled oil prices, and is now down 15%. He estimates that by the year 2000, *per capita* production will be little more than half the 1973 level. With respect to "renewable" resources, the outlook is no better. Brown points out that world production *per capita* of key commodities of biological origin also appears to have peaked. Wood production *per capita* peaked in 1967, and is now down 10%. Fish production peaked in 1970, and is now down 15%. Production of mutton peaked in 1972, and wool production as long ago as 1960. *Per capita* production of beef appears to have peaked in 1977, and is now down 10%. *Per capita* grain production has been virtually level since 1971, except for one bumper harvest year.

C. *Economics*

These resource trends have not only environmental significance, described in the next section, but also economic implications. These implications are somewhat different for the United States and other industrialized nations and for the developing countries. In each case, they are serious.

Throughout our history, Americans have been accustomed to a steadily rising standard of living and the expectation that children will be substantially better off than their parents. However, since 1973, the real spendable income of the average American worker has grown very slowly.

In addition to relatively flat earnings, the 1970s brought high levels of unemployment and inflation. Many analysts, including economists, have great difficulty in explaining what has happened to our economy. While the total picture is complex, some of the slowdown surely is due to the global resource trends just outlined, as well as to domestic resource limits.

Over any given time period, the rate of real material growth in the economy is the outcome of a contest between the rate of increase in productivity - due to greater worker efficiency, capital investments, and technological improvements - and the rise in real costs due to increasing scarcity of raw materials, increased costs of pollution control and worker safety, and other factors. It appears that during the 1970s these real costs rose more rapidly, compared with productivity, than in the past. Viewed from the American perspective, the real cost of oil rose sharply, while technological improvements did not enable us to produce the quantities of low-priced oil we would have liked. Food, another large contributor to inflation during the decade, may be abundant in this country but is scarce worldwide. Grain purchases by the Soviet Union have been the most publicized cause of U.S. price rises. But, as noted in a Washington Post editorial, "The central fact of the world grain market is steadily rising demands, as people in every region raise their standard of living." Lester Brown's analyses of per capita consumption, reported earlier, indicate that the same is true of other commodities of biological origin.

In the distant past, our supplies of clean air and water were so great that we could use them not only to breathe and drink but also, without thought, to dispose of domestic and industrial wastes. Those days have passed. The United States is now spending tens of billions of dollars per year to clean up air and water and prevent further degradation. The Environmental Protection Agency has estimated that federal programs to control air and water pollution cost the Nation $84.8 billion between 1970 and 1977, and will cost an additional $360 billion between 1977 and 1985. Moreover, with the widespread introduction since World War II of such technologies as synthetic chemicals and nuclear power, we have taken on new and expensive burdens. They include regulation of nuclear power, including disposal of radioactive wastes; disposal of highly toxic chemical wastes, now estimated to require billions of dollars for cleanup alone; and control of potentially carcinogenic chemicals in industry, agriculture, and consumer products. These tasks, which are essential to public health and safety, have significant (though often exaggerated) effects on real costs.

It seems likely that the slow growth experienced by the United States will continue at least through the mid-1980s. There is increasing evidence that this economic stagnation will be shared by most other industrialized nations.

In the developing world, the situation will vary from country to country, but the overall outlook also is for slowed growth. The U.S. Government's *Global 2000 Report* estimates that during the period 1985-2000, the rate of *per capita* growth in GNP in Africa will drop from 2.2% to 1.4% as compared with the previous decade, in Asia from 2.7% to 2.3%, and in Latin America from 2.6% to 1.8%.

As these nations raise their industrial production and standards of living, they inevitably will devote more resources to dealing with the public health hazards just described. As their burgeoning populations place increasing pressure on biological systems, the deterioration of those systems will limit production of food, wood, meat, and other commodities. This effect, already evident in the Sahel, Haiti, and other places, is documented in a recent report by the UN Economic Commission for Asia described in more detail in the next section.

D. *Environment*

Human activities degrade the environment in two fundamental ways. First, we overuse or unwisely use resources, as when misuse of soils causes erosion or overexploitation of forests causes permanent deforestation. Second, we utilize technologies which have unwanted effects, as when industrial processes cause air and water pollution, release of fluorocarbons threatens climatic change, or nuclear power leads to weapons proliferation or the escape of radioactivity.

Overuse or unwise use of resources still causes much environmental harm in the United States. Evidence of extensive overgrazing in the West and massive erosion of croplands shows that we still have far to go. However, U.S. population growth has slowed, our governmental machinery is adequate to prevent abuse, and there is a general commitment to sustainable development of resources. Broadly speaking, the same is true in most other industrialized nations.

In many developing nations, the opposite is true. Population growth is rapid, urbanization is swift and uncontrolled, governments are ineffective, and unsustainable development is the rule. Many of these countries seem certain to experience massive, irreversible deforestation, soil erosion, and desertification. This will reduce food and fuelwood production, with impacts on worldwide food and energy demand. Among the important findings of the Global 2000 Report are that by the year 2000:

- Forty percent of the world's tropical forests will disappear.
- Tropical deforestation and other causes will render extinct at least 500,000 living species, some 20% of all those on earth.
- Deforestation will worsen the lot of the hundreds of millions for whom wood is the main source of energy.
- Soil erosion will remove, on the average, several inches of precious topsoil from croplands all over the world.
- Desertification will accelerate from the present rate, which annually renders unproductive an area the size of Maine.

A March 1982 report by the UN Economic and Social Commission for Asia and the Pacific confirms that the countries of Asia face major environmental problems which threaten the productivity of the resource base. The problems cited in the report include deforestation, erosion, and declining productivity of soils, increased flooding and deterioration of water quality, urban air pollution, and a continuing decrease in marine resources such as edible fish.

The other cause of environmental harm, ill-considered use of technologies, originates mainly in the industrialized countries, though the impacts are felt everywhere. None of the major problems with nuclear power - weapons proliferation, safety, waste disposal - has been solved. Weapons proliferation is probably the greatest threat. In three unstable regions of the world - the Middle East, South Asia, Southern Africa - new nuclear weapons states (Israel, India, South Africa) have appeared within the past decade. A number of other countries - including Pakistan, South Korea, Taiwan, Brazil, and Argentina - are moving toward possession of the bomb. When half-mad dictators like Libya's Colonel Qaddafi or subnational groups like the PLO acquire them (perhaps in 5-10 years), the world will be a different place.

Man-caused climatic change is a looming threat. The release of fluorocarbons thought to deplete the ozone layer and warm the atmosphere has been slowed but not stopped. The release of carbon dioxide, due to fossil-fuel combustion and forest destruction, will have an even greater warming effect.

We are running grave risks with respect to toxic substances which may cause adverse health effects. The United States and a few other countries have laws on the books which may be minimally adequate. Most countries do not, and nowhere (except perhaps in Sweden) are adequate laws actually in operation.

Pollution control is a relative bright spot in the industrialized countries. The United States has successfully controlled some major pollutants. So, if offical reports are to be believed, have other industrialized nations. However, we are in danger of sliding back, and some major problems, such as acid rain and toxic pollutants,continue to get worse. Pollution is a serious and growing problem in the developing nations, where drinkable water and elementary sanitation measures are the exception.

It should be emphasized that there may be serious environmental problems of which we are not yet aware. After all, the threat of depletion of the ozone layer by fluorocarbons was not known until 1974, even though fluorocarbon emissions began long before that. The lesson is that we must continually monitor biological processes and global geochemical cycles, and must support basic research of the kind which uncovered the ozone layer problem. Otherwise, we may not find out about problems until it is too late.

E. Conclusions and Outlook

1. Industrialized Nations

We in the United States face two main domestic environmental challenges. The first is to move rapidly toward sustainable, environmentally tolerable energy sources. Despite the ill-considered federal subsidy for synthetic fuels, there is reason to hope that the energy crisis can be solved without excessive use of coal, which will warm our atmosphere and alter our climate due to carbon dioxide buildup, or breeder reactors which will lead to nuclear weapons proliferation. My optimism is based on the prospects for very large, cost-efficient energy savings through feasible conservation measures and rapid development of practical solar technologies. As Lester Brown has said, it is entirely possible that solar collectors soon will sprout on the roofs of homes the way television antennas did in the 1950s.

The second challenge is to prevent political pressures generated by slow economic growth from forcing repeal of hard-won pollution- and toxics-control laws and invasion of our last unspoiled natural areas. These pressures are all too evident today. If we can resist them, the United States should reach the year 2000 with reasonable domestic environmental quality. Much the same can be said of the other industrialized nations.

2. Global Commons

The prospect for the global commons is not so good. Effective institutions for controlling impacts on the atmosphere and oceans are largely nonexistent. The Law of the Sea Treaty, if it comes into force, will provide a framework but by no means solve all the problems. With respect to the atmosphere, the restrictions in many countries on release of fluorocarbons are among the few bright spots. Acid rain and the buildup of carbon dioxide continue unabated. During the 1980s, slow economic growth in the industrialized nations and pressures to accelerate short-term growth in developing countries will make it hard to agree on international action to protect the commons.

3. Developing Nations

The outlook for many developing nations is grimmer. Experts are divided as to whether technological progress can outpace population growth and stresses on ecosystems to make possible adequate, sustained material growth in most of these countries.

Unfortunately, the optimists are mainly economists, while the pessimists often are ecologists. The many problems in these nations are compounded by governmental and institutional deficiencies — lack of trained personnel, corruption, and others — which make effective responses very difficult. In some developing nations, destruction of the natural resource base and other factors are likely to bring economic growth to a halt, perhaps triggering a vicious cycle of further destruction. This process has begun in the Sahel and Haiti, with tragic consequences.

The maintenance of a sound natural resource base in these countries is important not only to their own welfare, but to the solution of such global problems as controlling nuclear weapons proliferation, preserving global genetic diversity, protecting the oceans, and preventing catastrophic climatic change. Moreoever, if ecological collapse causes numerous countries to join Haiti among the world's basket cases, it is hard to imagine that the United States and other industrialized nations can remain comfortable, clean and affluent while the majority of humanity is poor, hungry, hopeless, and nuclear-armed. Yet the economic difficulties of the industrialized nations make it difficult for them to assist developing countries in solving their environmental problems.

F. Final Thoughts

In examining the pieces of the picture, there is a danger of losing our perspective on the picture as a whole. Peering through the glass darkly, my view is that there is some good news and some bad news. One piece of good news is that the data in the Global 2000 Report and most other analyses don't support a terribly pessimistic outlook for the year 2000, if we exclude the problems of nuclear war and nuclear weapons proliferation. In most parts of the world, the Report projects that things will get somewhat better. There will still be problems, and because of population growth they may involve just as many people, but most of the world's population will be better off in material terms.

Another piece of good news is that if we heed warnings like those in the Global 2000 Report, we can make things better than they otherwise would be. If we look ahead and identify systematically the major problems of the future, and we have the political will to devote resources to them while there's still time, we can accomplish a lot. I will discuss specific responses a little later.

The bad news, as I see it, is in two categories. First, nuclear weapons. The nuclear arms race among the superpowers continues unabated. Encouraged by our example and their own insecurities, more and more countries are acquiring nuclear weapons. I cannot be optimistic about our ability to contain this awesome force. Yet, as Jonathan Schell pointed out so eloquently in his recent New Yorker series, a full-scale nuclear war might be the ultimate catastrophe for humanity.

Second, ecological stress. We are approaching the ecological limits of the earth in a number of ways. It appears that in the 1970s we entered a new era. It is not that there are rigid, absolute ceilings on economic growth. If there were, the situation might be hopeless because we need economic development, especially in developing countries, if we are to stem population growth and relieve pressures on natural systems. But there are very real limits - the carrying capacities of natural systems, the oceans, the atmosphere. We cannot exceed these limits without reduced or even negative growth, in the longer run. In some places, like the Sahel and Haiti, they have been exceeded, and the results are terrible to contemplate.

A mixed piece of news is that, during the 1980s, the effects of global environmental problems will become more manifest and penetrate the public consciousness to a greater extent. The number of "ecological refugees" will increase. Since they will include refugees from the Caribbean and Central America, the United States will become increasingly aware of their ecological and resource problems.

By the end of the decade, if scientists are correct, we will perceive an unambiguous atmospheric warming due to the buildup of CO2. There will doubtless be accompanying climatic changes, though no one now can predict their magnitude. Higher prices for meat, wool, and other biological commodities will thrust the population-resource balance into people's daily lives.

Extinctions of animal and plant species especially in tropical forests, will jump dramatically. Zoos will become the last refuge for some species, but ecosystems cannot be preserved in zoos, and many will perish forever.

These signals will help to make the public and politicians more aware of these problems and the need to respond. As discussed in the next section, this awareness is essential.

II. Responses

Responding to environmental problems like those just described is a complex process. While each issue has unique features, it is possible to identify five stages in the response to almost any problem.

(1) Recognition and definition. Before a response can be developed and implemented, decisionmakers must first recognize that there is a potential problem which may require corrective action.

(2) Scientific assessment. Since these issues commonly involve scientific questions, scientists must verify their seriousness and extent.

(3) Review of possible responses. The options must be compared and their costs assessed.

(4) Political decision. The decision whether and how to respond normally will be taken by national governments, either unilaterally or in consultation with others, often through an international organization.

(5) Implementation. This step involves the commitment of monitary and other resources, and has often proved the most difficult.

Because of the number of prerequisites, the fact that the prerequisites usually are satisfied at different times in different nations, and the many actors involved, responding to major environmental problems is a slow, somewhat chaotic process. While it may be possible to diagram that process neatly for any particular problem in any one country or international organization, the interaction of many problems, countries, and organizations is bewildering. Some important principles may, nevertheless, be deduced from the experience of the past ten years.

A. The Interrelatedness of Population, Resources, Environment and Development

The Stockhom Conference was ahead of its time in recognizing this interrelationship: The 26 Principles enunciated at Stockholm emphasize the importance of each of these elements. The Bucharest Population Conference and the UN Conferences on Water and Desertification addressed issues of population and resource management. The Global 2000 Report specifically focussed on the interaction between population, resources, and environment.

The relationship between environment and development has proved most difficult to define. The environmental movement which sprang up in the Western nations in the early 1970s focussed on industrial pollution and tended to see technology as the enemy, a view popularized by Barry Commoner in The Closing Circle. Some espoused "no-growth" philosophies antithetical to economic development. Many environmentalists thought representatives of developing countries were clouding the issue when they stated at Stockholm that "poverty is the worst form of pollution." Many in developing nations thought that industrialized nations were using environmental concern as an excuse to deny them development. Despite the fine words of the Stockholm Principles, there was a major gap.

In part because of experience, in part because of missionary work by UNEP, IUCN, and others, that gap has closed. Developing nations, by and large, are now concerned about the environment, by which they mean the productivity of soils, clean and adequate water supplies, and other essentials. As stated eloquently in the World Conservation Strategy, environmentalists have come to realize that in developing countries environmental quality depends on development which meets human needs.

The gap may now be wider in the industrialized nations. Environmentalists and industry are too often at loggerheads, too often unwilling to see each others' points of view. A rapprochement is needed, but does not seem imminent.

B. The Political Nature of the Obstacles

We face serious problems, but for the most part we have the technical know-how to respond. Some issues require more research, and there is a general need to step up monitoring and assessment efforts. But the chief task is to apply the knowledge we already possess, and the main obstacles are political and social.

What is needed is the political will to recognize that these problems are vitally important and to devote greater resources to them, even in times of economic slowdown. This will be difficult. But is not impossible, for we are not speaking of astronomical amounts of resources. Less than ten billion dollars per year, worldwide, would go far toward bringing these problems under control. This is 4/10 of 1% of the U.S. GNP, and less than 2/10 of 1% of the GNP of the Western industrialized nations. It is a small fraction of what we spend on defense against military threats which are no more real.

C. The Primacy of Nations

We live in a world of independent nation-states. Therefore, the political decisions to respond to environmental problems will be made by nations. Nongovernmental organizations can play important roles in mobilizing public opinion and persuading governments. International organizations can provide fora for government consultations and consensus-building. But when one lifts the veil which conceals decisionmaking in international organizations, one usually finds that one or a few nations pulled the strings. Some problems, involving transboundary pollution or the global commons, cannot be solved without international cooperation. But in the end, it is nations which decide.

It has sometimes been suggested that the way to proceed is to determine priorities and then go after the high-priority problems. This ignores the primacy of nations, which will have different priorities. Moreover, assigning priorities to problems in effect means devoting resources to their solution. There are in practice two stages of priority-setting: the stage of rhetoric, at which it is stated that a problem has priority, and the stage of reality, when resources are actually devoted to it.

The Stockholm Action Plan, though dated, is probably the best indication of the priorities the family of nations as a whole assigns to the various problems. Few genuinely new priorities seem to have emerged since the Stockholm Plan was enunciated. However, the Stockholm Plan was the stage of rhetoric. It is interesting to compare, as UNEP and others have, the Action Plan with the steps taken to implement it.

A detailed description of my own priorities would not be of much interest. I will mention four problems which, in my opinion, are being neglected. They are: soil erosion, loss of biological diversity, exports of hazardous substances, and overfishing.

Because of the primacy of nations, there would be little purpose in an elaborate international system for setting environmental priorities. It is helpful for scientific organizations like the International Council of Scientific Unions systematically to assess potential problems. It is useful for nations to get together periodically to compare priorities and agree on them to the extent possible. International organizations can facilitiate this, as UNEP does through its Governing Council meetings. But this is the level of rhetoric. A striking pattern of the 1970s was the frequency with which problems nations solemnly agreed were priorities - desertification, rural sanitation, etc. - were largely ignored when it came to spending money. When estimates of the cost of responding to a problem, such as FAO's estimate of several billion dollars for reforestation, are too high, they fall on deaf ears. It is the industrialized nations which hold the pursestrings,and they are not feeling generous.

D. United States Leadership

A book will appear later this year under the auspices of the American Society of International Law, assessing the elements necessary for responding to international environmental problems. It concludes that the element most often present was U.S. leadership. Of course, U.S. leadership alone is not enough. Others must be willing to follow, and there have been successes not involving the United States. But it often has made the difference.

The United States consistently has been a leader on these issues since the Stockholm Conference, under both Republican and Democratic Administrations. We reaffirmed that position at the end of the Carter Administration with the appearance of the Global 2000 Report. There were plans for a systematic response to these problems which would have been unique for any nation.

A new Administration inevitably takes time to assess issues and get its feet on the ground. But after 15 months, that time has run out for the Reagan Administration. Despite attempts at leadership by the State Department and the Council on Environmental Quality, ideologues within the Administration have largely prevented meaningful action. The consequence is that the United States has virtually lost its leadership position, and is sending mixed signals at best to the rest of the world.

A telling example is the recent crusade by Richard Funkhouser, head of EPA's International Office, to block the release of and disassociate the United States from an innocuous OECD workshop report on global issues. Infighting over matters of this sort exhausts U.S. officials who have better things to do, and confuses our friends in other nations.

Though the time is late, the Administration can still reassert constructive U.S. leadership. I hope the generally positive testimony by Administration representatives on March 31 is a sign that the United States will do so in Nairobi.

E. The Importance of Public Awareness and Nongovernmental Organizations (NGOs)

Governments are unlikely to respond to these problems without widespread public concern and support, often fostered by NGOs. It is no accident that the nations most active in addressing these issues - the United States, Sweden, The Netherlands, and Canada - are still countries where public awareness is high and NGOs have unusual influence.

There is increased interest and activity concerning these issues on the part of U.S. nongovernmental organizations. This is of great importance. A respected environmentalist and politician, Governor Richard Lamm of Colorado, has noted:

> Most of the change that has occurred in the United States over the last 20 years has been made by leaders outside the political system. The civil rights movement, the women's movement, and the environmental movement were all initiated and led by people outside the political system. Public leaders confirmed into law changes which have their genesis in sweeping value changes elsewhere.

One encouraging sign has been the formation since the appearance of the Global 2000 Report of two new nongovernmental organizations. The Global Tomorrow Coalition, which I represent in part of my testimony, was founded in 1981 and is a coalition of 56 organizations, including almost all of the leading groups in the United States concerned with population or the environment. The Year 2000 Committee, founded in 1980, is a group of emminent individuals co-chaired by Robert O. Anderson, Chairman of the Atlantic Richfield Company, and Russell Train, former Administrator of EPA and currently President of the World Wildlife Fund's U.S. Appeal.

F. The Essentiality of International Organizations

Responses to these problems almost always involve international cooperation, which is essential when issues involve transboundary pollution or the global commons. Cooperation, in practice, is very difficult without international organizations. Therefore, it is important to strengthen the international organizations which can play key roles. Each international organization should be examined on its merits and strengthened in ways which will enable it to play the most useful role.

One agency which deserves support is UNEP, which was established at the Stockholm Conference and has accomplished much in its brief existence. One of UNEP's main objectives is to coordinate resource management efforts within the UN System so as to avoid waste and duplication. It has achieved considerable success, as indicated by the System-Wide Medium-Term Environmental Plan which will be presented to the Session of Special Character in May.

UNEP has a valuable capacity for bringing about international cooperation because it is respected all over the world as a nonpolitical agency dedicated to solving problems. UNEP's successful Regional Seas Program has brought about cooperation essential to the cleaning up of numerous seas threatened by pollution. UNEP helps safeguard agricultural productivity through global monitoring of threats to climate, such as those from CO2 and fluorocarbons. UNEP helps protect genetic resources of immense value to agriculture and pharmaceuticals, especially through UNEP's assistance to the International Union for Conservation of Nature, producer of the excellent World Conservation Strategy. UNEP has been effective in improving the capacity of developing nations to manage their own natural resources, and UNEP has a strong program of cooperation with business and industry.

In view of this track record, it is incomprehensible why the Reagan Administration has targeted the U.S. contribution to UNEP for a 70% budget cut. This cut - far more proportionally than that imposed on other UN agencies - would deal a devastating blow to UNEP. It also sends exactly the wrong signals with respect to U.S. concern about the global environment.

In view of UNEP's financial constraints, the U.S. Government should consider assigning more experts to serve on UNEP's staff. The same policy should apply to other key agencies, such as FAO.

G. The Role of Development Aid Agencies

Development aid agencies annually spend some $35 billion and have great impacts on development. There is a need to make aid projects environmentally sound, and to strengthen the environmental components of aid programs. The multilateral lending agencies have signified their concern by signing a declaration and forming the Committee of Development Finance Institutions Concerned about the Environment. Yet their budgets are suffering because of economic stagnation in the donor countries.

Bilateral aid agencies are also improving. A leader is the U.S. Agency for International Development (AID). One of the Reagan Administration's accomplishments has been to maintain AID's leadership role, as recorded in Administrator McPherson's testimony on March 31. Nevertheless, these agencies - which are likely to remain the main conduits of assistance from industrialized to developing countries - are doing far too little about environmental problems.

H. The Role of Science and Scientists

The informal, international network of science has played a key role in assessing problems and devising responses. We tend to take this process for granted, but without a scientific consensus on both a problem and the proposed response, no effective action is likely.

There is a need for a better mechanism to facilitate the formation of politically meaningful scientific consensuses on major issues of international significance. Examples include the effects of fluorocarbons on the ozone layer and climate, and the climatic effects of atmospheric carbon dioxide. As the fluorocarbon controversy made painfully evident, there is no institutional mechanism for forming a scientific consensus on such issues among nations which must act if problems are to be dealt with. In the case of fluorocarbons, the mechanism now being employed is an *ad hoc* one: periodic meetings under UNEP auspices. Although UNEP is doing a remarkable job, this mechanism has obvious deficiencies in view of the distance from Nairobi to centers of scientific excellence and the lack of technical depth in UNEP's small staff.

What is needed is a kind of "International Academy of Sciences" which has the prestige and resources to pull together the leading scientists from key nations, in a nonpolitical setting, to discuss an issue and build a consensus in time for concerted political action should the evidence warrant it. This organization should be essentially nongovernmental, though funding from governments probably be necessary. One possible vehicle is the International Council of Scientific Unions (ICSU), which has prestige but lacks the resources to build consensuses on major issues regularly and quickly. Another possibility might be the International Institute for Applied Systems Analysis.

I. The Need for Forecasting Capability

Forecasting is not an esoteric activity. Predictions of future conditions are necessary in many fields of human endeavour: agriculture, meteorology, economic investment, personal financial planning, national defense, and others. Most forecasts concern future conditions in a single sector, but predictions about the future of the nation or the world are not uncommon.

Every prediction is premised upon a model of the way the relevant part of the world operates. In recent years, the advent of computers has made it possible to create more complex and systematic models. Some of these computer models are sectoral, such as the models of the national economy widely used in economic forecasting or the Model of International Relations in Agriculture, an agricultural model developed at the Free University of Amsterdam.

Other models have taken the whole world as their subject. The most famous is the Limits to Growth model, produced in the early 1970s at MIT and sponsored by the Club of Rome. Others include the Strategy for Survival Model, produced by Mesarovic and Pestel and also sponsored by the Club of Rome; the Latin American World model produced at the Barilioche Foundation in Argentina; the Systems Analysis Research Unit Model, developed at the United Kingdom Department of the Environment; the United Nations world Input-Output model, developed by Wassily Leontief at Brandeis University for the United Nations; the Interfutures model, sponsored by OECD; and the Global 2000 model prepared by the United States Government in 1980.

The steps involved in creating a model are logical and not very complicated. One gathers the relevant data, creates the model, runs the data through the model to create projections, and uses the resulting information to improve the model and collect better data.

Sectoral models have proved extremely useful. Agricultural, meteorological, and economic forecasts are used routinely. Despite their deficiencies, they are deemed essential.

The utility of general global models is much more questionable. So far as I can tell, these models have been useful mainly in making us aware that there is a connection between sectors previously thought unconnected, and in promoting improvements in the art of modeling.

This may seem a harsh verdict, but there are obvious reasons why general models are likely to have practical deficiencies. The first is the problem of global averages. A model which operates at so general a level as to obscure the situations in most nations, much less localities, is likely to be of little practical value except with respect to truely global problems like the build-up of carbon dioxide in the atmosphere. And models focussed on problems like CO2 might will be termed sectoral rather than general.

A second problem is that of poor data. On a worldwide basis, data about many important trends - deforestation, soil erosion, climatic change, effects of toxic substances, and more - are poor. And the most basic role in using computers is: Garbage in, garbage out.

These deficiencies do not mean that we should give up on modeling. General global models have been useful in promoting awareness of hitherto unnoticed interactions between sectors, and in focussing attention on the need to collect better data. However, in the near future, more practical results are likely to come from sectoral and national models. National models can, to a great extent, avoid the problem of global averages. Moreover, national models are desirable because nation-states are the fundamental units of decisionmaking in this world. A model which tells a nation about trends that will affect its interests can stimulate decisions to alter those trends. As mentioned previously, sectoral models are already essential in many fields, and are being improved. It may be that in the future the best global models will be the sum of national and sectoral models.

A variety of institutions play roles in forecasting. International organizations, national governments, and nongovernmental organizations (NGOs) all have the capacity to gather data, to build and operate models, and to improve models. For example, nongovernmental universities and scientific institutions play major roles in data gathering and analysis. So do international organizations (e.g., UNEP and FAO) and agencies of national governments. With respect to model building, it is interesting that of the seven general global models cited previously, three - Limits to Growth, Strategy for Survival, and Latin American World - were produced by NGOs, two - Systems Analysis Research Unit and Global 2000 - by national governments, and two - World Input-Output and Interfutures - by international organizations. The most systematic effort to improve models has been the periodic conferences convened by the International Institute for Applied Systems Analysis, a unique international, nongovernmental organization with strong ties to governments.

In addition to functional capabilities, an important consideration is what institutions are likely to produce the most credible models. A "United Nations" model will be mistrusted in some places. A national model may be suspect abroad, and at home if it is thought to be politically biased. The credibility of a nongovernmental model depends on the identity, nationality, and interests of the NGO which prepared it. Thus, all three types of institutions have strengths and weaknesses. One generalization is possible: A nation will base significant decisions on a model only if it has been carefully reviewed and approved by that nation's own experts.

As we have seen, population, resource, and environmental problems are likely to become more acute during the 1980s. Accurate, credible forecasts are essential if we are to anticipate and respond to these problems. Thus far, the models which have succeeded in this have mainly been partial and sectoral. Many problems are not being responded to, or are being responded to inadequately, because of disagreements about relevant projections.

What, then, needs to be done? I have four suggestions. The first deals with our own country's foresight capacity. The Global 2000 Report illuminated deficiencies both in the data base and in the U.S. Government's modeling capabilities. These lessons should be heeded. The United States should take steps to improve its own forecasting capabilities and systematically to improve the data base. It is incredible that this Nation, with the most sophisticated data processing systems in the world, a high degree of computer modelling expertise, unexcelled policy analysis capability, and an awareness of the need to anticipate and respond to long-term problems, has reached the last decades of the twentieth century with no institutional entity at the highest level of government charged with utilizing these capabilities to analyze global issues and trends.

The Global Tomorrow Coalition has 56 member organizations ranging from the League of Women Voters to the National Audubon Society to Zero Population Growth to my own Natural Resources Defense Council. The Coalition requires the unanimous consent of all its members before it can take a public position. The first, and thus far the only, issue on which it has done so is the question of U.S. foresight capacity. The Coalition's statement reads as follows:

> Current trends of rapid population growth, wasteful resources consumption, and abuse of the environment endanger the global base for all human activity. The United States is poorly equipped to identify and project the interactions of these trends over time, and is therefore unprepared to choose rationally among long-range policies to achieve a more desirable future.
>
> We believe this situation constitutes nothing less than a threat to U.S. national security and to the future well-being of the American people. Our national foresight capability must be improved by efforts in both the public and private sectors. As first steps in this direction, we recommend the following actions:
>
> (1) establish in the Executive Office of the President an improved capacity to coordinate and analyze data collected by federal agencies and other pertinent sources on the long-term interactions of trends in population, resources, and environment — and their relationship to social and economic development — and to provide information relevant to current policy decisions responsive to the needs of the national and global future;

(2) encourage and facilitate widespread public participation in the discussion of choices for a desirable national future; and

(3) invite other nations to expand their own foresight capability and share in an international exchange of relevant data and information.

It is time for action — either through the Administration or Congressional initiative — to establish in the Executive Office of the President an institution capable of producing through government-wide coordination, regular and improved projections of global population, resource, and environmental trends, using the best up-to-date data available to federal agencies. This institution should prepare official reports of these projections and analyses of their implications for government policy, which the President should submit to Congress and the public biennially.

In addition, I personally believe that in coordination with this activity in the Executive Office of the President, there should be established a public-private institute which would foster research, using to the best advantage the expertise and resources of the public and private sectors, to improve the development of global projections, their analysis, and their use by decisionmakers. This new institute would be a hybrid public-private institution, governed by a board appointed from both sectors. It would work closely with the new institution to be created in the Executive Office of the President.

The new public-private insitute would have several roles. First, it would strengthen the Government's data capabilities by creating or enlisting other NGOs to create needed models and other analytic tools. Second, it would carry out integrated policy analyses to provide the Government with a basis for programmatic decisions, and would stimulate independent analyses of global resource, population, and environmental problems by other NGOs. Third, it would maintain close relations with capable NGOs within and outside the United States, so as to give the U.S. Government the benefit of their talents. Through the institute, U.S. Government agencies would contract with these NGOs for needed services.

My second suggestion is that the United States should support strongly international organizations which are functionally suited to gathering data and building and improving models. Within the United Nations system, these include UNEP, FAO, WMO, and others. Outside the UN, they include the OECD and IIASA. It is unfortunate that, in order to fight a skirmish in the Cold War, the United States appears to have decided to pull out of IIASA. I have already commented on the U.S. reaction to OECD's efforts to apply to these problems its considerable skills at coordination and data gathering.

My third suggestion is that those involved in building models should design them to produce useful forecasts. This may seem obvious, but it appears seldom to have occurred in the past. Those who design models, whether sectoral or global, should consider and consult those who are likely to use them. They should produce information of a kind and in a form useful to decisionmakers. The day of forecasts as purely academic exercises should largely be over.

Finally, there is an urgent need to improve the data base, and U.S. leadership is badly needed. This work is tedious and unexciting, but absolutely essential. International organizations, national agencies, and NGOs all have roles to play. However, they basically must be funded by national governments. The United States, under pressure of the current budget crisis, is moving in exactly the wrong direction, reducing its data gathering and analysis efforts. The Administration proposes to reduce research into the carbon dioxide issue. Potentially vital applications of LANDSAT technology to developing-country resource problems are largely being ignored. One could go on and on. We will pay for these "savings" many times over in the future. The United States should step up its efforts. The Executive Office institution and public-private institute just recommended could play important parts in designing and carrying out this effort.

Mr. **Bonker**. Thank you, Mr. Stoel.

I would like to thank each of the witnesses for excellent testimony.

Mr. Pritchard.

Mr. **Pritchard**. I have no questions.

Mr. **Bonker**. I have just a few questions. I think you covered a lot of area. If you were to prepare the agenda for the upcoming Nairobi Conference, what two or three topics would you include that you feel are a top priority in terms of global environmental issues going into the 1980's?

Mr. Stein, I will start with you and run through everybody. Be brief, just two or three topics.

Mr. **Stein**. I think advancing from where we have been with the Stockholm Declaration and the various principles of responsibility and liability to see whether some of them can be furthered in specific cases, and whether, as I mentioned in my testimony, there are mechanisms developed for resolving some of the disputes which I believe are going to come up would be one.

Two, would be increasing monitoring capability. I think UNEP has started in that direction and one of the things that the earlier testimony by people such as Gilbert White have shown is we really have not fully appreciated the interactions of various things that are going on in the environment.

Some of these very complex things I think need a hard look and a fast look.

For the area of environmental management, I think the programs on the regional seas is a program which UNEP has done very well. To extend that and to get full support from governments in that is a third area which I think should be fostered.

Mr. **Bonker**. Mr. Robinson.

Mr. **Robinson**. Without repeating myself, I think there are a number of things that could be done. One is that UNEP itself needs cultivation as an agency. We have had 10 years experience. No one thought the environmental problems could be solved overnight. The United Nations environment program needs to be streamlined a little bit. We need better working relationships with the other agencies through a systemwide planning process.

The United Nations environment fund, the procedures of the governing council and the operations of the Secretariat could all be improved, and there are a number of just good management techniques which could be instituted.

I think UNEP needs a much stronger presence in Europe because it is too expensive for everyone to go to Nairobi all of the time. The other United Nations agencies are located in Europe, and I think we are going to have to see an expansion in Geneva perhaps of some of UNEP's activity.

Rather than comment on substantive policies as to how we make policy, I think the U.S. Government has not really adequately orchestrated its own on foreign policy on environmental protection, and has not been doing so for a long time. It has been leaving it up to each of the line agencies to determine this policy for itself. Until the State Department has a better ability to integrate the foreign affairs agencies' concerns regarding the international environment, we are going to have a disparate and rather checkered foreign policy in this area.

Mr. **Bonker**. Mr. Stoel.

Mr. **Stoel**. I have two basic suggestions. I happen to think that the main significance of the session of Special Character the way it has been set up, will be to register the views after 10 years of the various governments. I think that is going to be very significant, because we are going to see, unlike the reality at Stockholm, that the developing countries have now joined in the worldwide concern about environmental and resource issues.

I think that the agenda that was decided on at Stockholm is still remarkably sound. Relatively few new problems have emerged. What we have to do is work on these issues, problem by problem, but with a special attention to the realities of the resources devoted to them. We simply are devoting inadequate resources to problems like reforestation and desertification, and we have to face up to that reality and not pretend that someone in Nairobi or someplace is handling the problem.

The world community simply is not devoting enough resources. Yet the total amount of resources necessary is surprisingly small when you think about the magnitude of these problems and their implications for the future of the planet. A relatively small amount of additional resources could do a lot.

The second thing I would mention is the need for additional scientific assessment. Many of these problems are not well enough understood yet, so we can't devise the best solutions. The United States has a special role to play here and, unfortunately, we are backpedaling in the amount of money we are spending on research on things like carbon dioxide.

Worldwide we need to step up our capabilities and investments in this area as well. Again, the amount of money would be very small, and the payoffs would be extremely large.

Mr. **Eckholm**. I would just make two suggestions that relate specifically to the role of UNEP.

First we need to improve the global environment monitoring system. Over the last decade the groundwork has been laid with methodologies but there has been very little drawing together and assessing of the implications of trends.

I believe Gilbert White pointed this out also. I think we need to encourage UNEP and give them the resources to do more of what they call in their terminology assessments, which might in turn then be linked to world action plans to do something about problems.

It's a very good way to gain consensus on international issues so one country does not get caught too much out in front. The tropical forest assessment, which was the first major one, was excellent and set a good precedent, but it will take money to do more, and if we cut their budget it's not possible.

Second, the role of their International Registry of Potentially Toxic Chemicals ought to be strengthened. It's an international mechanism for informing people, especially Third World officials not in the mainstream, about chemicals hazards. If we strengthened this program it would make it less likely that our country would face any competitive disadvantage because of our own regulations; but again it will take money.

Mr. **Bonker**. You know, it's been interesting in the course of these hearings, looking at the various reports that are coming out these days that are sponsored not by environmental organizations necessarily, but economic agencies. The OECD, the Organization for Economic Cooperation and Development, and another report by a United Nations Economic and Social Commission. Their conclusion is inescapable, and that is the direct relationship between the deteriorating environment and the potential economic consequences to follow.

In the United Nations report referring to the countries of Asia, which face major environmental problems that threaten their future resource base, it states that the serious threat is the rapid shrinkage of the region's economically and ecologically vital tropical forests, to cite one example, their disappearance at an alarming rate.

In other words, to keep this world's economy going we need resources. If Weyerhaeuser in our area, for example, were irresponsible in cutting down trees and not replanting forests as they are, and improving them all of the time, the Northwest would look like Minnesota at one time. It would be rape and run.

In many parts of the world that is exactly what is happening. It seems to me that we ought to be able to make a strong appeal to an administration that has a one dimensional view of things, by and large, which is economic. Somehow if we are going to have long-term economic growth, it must involve environmental concerns.

Would you basically be in agreement? Maybe the environmental organizations ought to link up with some of the multinationals who have long-term views. Seriously, Weyerhaeuser is very astute about long-term investment in the forest resources.

If we always look at the short term, let's cut the budget now so we can look good in passing budget resolutions, and avoid long-term consequences, if we don't invest in environmental protection, I think we are going to leave future generations some enormous problems.

Mr. **Robinson**. Mr. Chairman, in that regard, the Sierra Club has been holding a number of meetings with some multinational corporations. They are the major transmitters of technology know-how around the world. They are a necessary step in the socioeconomic development of other countries and they can export environmentally sound hardware and techniques or take shortcuts.

We have been meeting with them to develop some common ground for how environmentally sound development can be exported along with our technology.

A country that destroys its resource base, as China has over the years, finds itself economically in a terrible situation. I met last year in China with some of their environmental leaders. In the first wave of laws adopted after the Cultural Revolution, when the Chinese recreated the criminal law, family law, and trade law, they went on to recreate or create for the first time their environmental laws.

Reforestation and environmental protection ranked as high in China as the reorganization of society. That is a very important process. The Chinese have a long way to go. The fact that they adopted the laws does not mean they are protecting the environment, but they are making major steps at the very highest level to move in that direction.

Mr. **Bonker**. Japan is doing the same thing. I just thought it was interesting.

When Mr. Funkhouser was testifying, we asked him about the notices for banned chemicals, export notices. The U.S. industry representative signed off on the review of this report, but the EPA representative was reluctant to support even that. So, maybe in some instances, industry can be ahead of government. I think that is a sad commentary, because we ought to have broader concerns than just what industry generally has.

One final question. I don't know enough about acid precipitation and the current debate. Mr. Funkhouser obviously is an authority on the subject. You heard his comments in response to the question about our negotiations with Canada. His response was the private sector was actually working responsibly in installing very expensive equipment and so forth, and we were way ahead of the Canadians in attempting to protect the environment in that respect.

Does that provoke anything in you or is what he said fairly common knowledge? I am really fairly neutral. I just don't know.

Mr. **Stoel**. I would make a couple of points, Mr. Chairman. I think we are doing more about air pollution than the Canadians, and that is because of our Clean Air Act. These scrubbers are expensive devices, and industry has no self-interest in putting them on. It's because of our statutes that this has occurred.

Mr. **Robinson**. I might just observe that the only reason the scrubber exists today is because this Congress wrote in the Clean Air Act the technology-forcing provisions of the Clean Air Act. At the time, it was the view of the industry and those involved in technology that it was theoretically possible to have scrubbers but they had not been developed and they were not shown to work yet. Congress went out on a limb because the American people wanted clean air, and said, "go out and develop the scrubber if you think you can do it, and even if you don't give it a good try."

And the scrubber was developed, and the scrubber is now state-of-the-art technology that can be installed, and many utilities have had to install them.

However, the availability of low sulfur fuels has meant that many utilities have not installed scrubbers. They simply shifted to meet air quality standards by burning lower sulfur fuels. We are now going back to coal and higher sulfur fuels and we are going to have to install scrubbers. A group in New York City, an independent think tank group called "INFORM," did a study of the costs of converting to coal by the utilities in the New York metropolitan area, and concluded that the utilities could convert to coal from their low sulfur fuels and install scrubbers and still not increase the cost of the electricity because the coal is substantially cheaper.

So I think we can make this transition in an effective way. Whether we have the will to do so depends on whether we want to continue protecting the health of our citizens.

Mr. **Stein**. If I could just add something, Mr. Chairman, about the bilateral discussions which have been going on between Canada and the United States. One of the statements made by Mr. Funkhouser about Canada not having standards similar to ours deserves expansion. I think in some ways one should not look at a specific standard because a different kind of government exists in Canada than exists in the United States.

The Provinces have a lot more authority under Canadian law than do the States under the U.S. Clean Air Act. What one should look at is the result under that other system of law to see whether that other country, whatever way, can come up with a similar kind of result. It is true that there is more deposition occurring in Canada from U.S. sources than the other way around, and it is also true that the kind of controls that the Canadian Government, both Federal and Provincial, have put on their industries has been prospective and will not take effect for some time.

So there is a perspective which might give the impression of imbalance. But I think one of the things which has held up the discussion between Canada and the United States has been the position of the administration that wants to get its own house in order first, figure out what should happen within the Clean Air Act and then take that position into the bilateral discussion.

Rather, I think there should be a little bit more give and take; find out what other legitimate concerns are, try and work those into the domestic legislation as well as feeding them into the bilateral discussion, so that the United States can recognize what some of the other countries' concerns are.

Also, one final point. I think it is a mistake just to look at the area of scrubbers in which Canada simply does not have any; the United States does. The Scientific Advisory Committee to the Governor of Ohio suggested there are techniques short of scrubbers which might be effective, which is coal washing, which could substantially reduce the sulfur content, be a lot less expensive, and be in a way an intermediate step until we find what the final kind of solutions are necessary.

So that is another thing I think could be looked at and tried.

Mr. **Bonker**. Sounds like we need a good mediator.

Mr. **Stein**. Yes, sir.

Mr. **Bonker**. I want to thank each of you for being here. I think you have given excellent testimony. It's all going into our record, which, hopefully, will be a valuable source of information for future consideration of these important issues.

Thank you very much for being here.

The subcommittee stands adjourned.

[Whereupon, at 4:45 p.m. the subcommittee adjourned.]

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APPENDIX 1

PRESS RELEASE BY U.S. INFORMATION SERVICE, JUNE 15, 1972

STATEMENT BY RUSSELL E. TRAIN, CHAIRMAN, U.S. DELEGATION TO THE UNITED NATIONS CONFERENCE ON THE HUMAN ENVIRONMENT

SUCCESS OF THE STOCKHOLM CONFERENCE

With the end of the Stockholm Conference in sight, my colleagues and I in the U.S. Delegation believe its success is assured.

Its success lies not only in the general benefit of having further awakened world awareness of the environmental crisis; more specifically, during these two weeks 113 nations have acted on a great many far-reaching proposals for international environmental action.

In my opinion, among the most significant recommendations, approved or expected, are those designed—

To facilitate the completion in 1972 of a global convention to restrict ocean dumping.

To minimize release of particularly dangerous pollutants—such as heavy metals and organochlorines—into the environment.

To organize global monitoring of atmospheric, marine, terrestrial and human health environments—a comprehensive arrangement termed "Earthwatch."

To collect and safeguard the world's immense variety of genetic resources.

To strengthen the International Whaling Convention, and to launch a 10-year moratorium on commercial whaling.

To set up an International Environmental Referral Service for exchange of environmental know-how among all countries.

To prevent national environmental actions from creating trade barriers against the exports of developing countries.

To improve water supply and sewerage in the rapidly growing cities of developing countries.

To give higher priority in development assistance to environmental values—such as land use, conservation and quality of human settlements.

To increase emphasis on population policy and family planning.

To create in the U.N. a permanent, high-level environmental unit and a $100 million U.N. Environment Fund.

This last step—which we hope will be completed by the U.N. General Assembly this fall—is in a very real sense the key to launching and coordinating all the rest.

It was brought to completion in two weeks of almost continuous negotiations here in Stockholm among many members, and is a truly composite product of this Conference.

As this statement is issued, the work is continuing on the Declaration. No country has striven or is striving harder than the United States in the arduous effort to get an agreed and meaningful text.

APPENDIX 2

STATEMENT OF NATIONAL WILDLIFE FEDERATION

NATIONAL WILDLIFE FEDERATION
1412 Sixteenth Street, N.W., Washington, D.C. 20036 202—797-6800

April 28, 1982

The National Wildlife Federation is a nonprofit organization, with over 4 million members and supporters. It is the largest grass-roots organization dedicated to the wise use, conservation and restoration of natural resources in the United States. The Federation has been active in the area of international environmental problems and in support of the United Nations Environment Programme for many years. We hosted the non-governmental organization (NGO) symposium "Uniting Nations for Biosurvival," held in Stockholm at the time of the United Nations Environment Conference in 1972. We have worked for several years on international as well as domestic acid rain, ocean dumping, whaling and endangered species trade issues. We have recently inauguerated a new international program to encourage improved natural resources conservation and sound resource management in developing countries.

The Federation would like to take this opportunity to express its support for the United Nations Environment Programme as a necessary actor in the environmental work of the 1980's. As the problems facing mankind grow broader and more international, the need for a coordinator and catalyst of joint efforts among nations becomes greater. This is a time for the United States to increase, not decrease, its financial support for UNEP, which is one of the few international bodies that can call upon all nations for constructive efforts to build a sustainable future.

Since that first environmental conference in Stockholm in 1972, our knowledge of the threats to our biosphere have evolved and deepened. From an initial focus on pollution resulting from industrial development, we are beginning to understand the devastating environmental problems caused by poverty and underdevelopment. We now realize that rapid population growth leads to destruction of forests, watersheds, marginal agricultural lands and biological diversity, and that reduction of population growth rates is related to economic development. In addition, many problems of truly international scale are emerging: trans-boundary air pollution, carbon dioxide build-up in the atmosphere, marine pollution, world trade in hazardous chemicals.

These problems, and more, cannot be solved by the efforts of any nation acting alone. No one nation can have a measurable impact on reducing fossil fuel emissions or marine pollution; and developing nations need a helping hand to improve natural resources management and to devise appropriate and sustainable economic development plans. If these problems are not dealt with, resource issues such as food and energy distribution could eventually threaten the economic and perhaps even political stability of many parts of the world. Additionally, declining biological diversity would limit our potential development of pest resistant food crops and new pharamaceuticals. Thus, joint international efforts, among both governments and non-governmental organizations, will be the only way progress can be made to improve the prospects for the long-term future of mankind.

The United Nations Environment Programme (UNEP) formed in response to the Stockholm Conference, is probably the most substantive attempt so far by any international body to come to grips with the intertwined problems of environmental degradation and sustainable economic development. Although UNEP's progress has been disappointing in some ways, measurable progress has been achieved in some areas previously seen as intractable problems.

One of the most significant developments since Stockholm has been the growth in understanding of environmental and conservation issues by developing country governments. From an initial suspicion that pollution was not their problem, and that environmental concern was a mask for rich nations to conceal repression of poorer countries, the developing world has begun to understand that resources conservation underpins their entire future. The number of governments that include environmental agencies has grown from less than one dozen in 1972 to over 110 in 1981. UNEP can take a large part of the credit for this, since it has made a special effort to reach out to developing countries. UNEP has been able to explain the interests that all peoples have in ecologically sound resources management, which the industrialized nations could not have communicated alone.

Besides this educational function, UNEP has developed and nurtured the Regional Seas Program, in which action plans to clean up the Mediterranean, Caribbean and other marine regions have been adopted. These programs wisely focused first on research and monitoring of the marine environments, so as not to challenge sensitive national sovereignty. But as the nations involved examined the research results, the spotlight naturally shifted to the land-based sources of pollutants which reach the seas. The resulting action plans are focusing more and more on curtailment of polluting discharges from within national boundaries. But the plans are cooperative and less antagonistic, because of the base of understanding that was built through the early research and monitoring phases.

Again, no individual nation, or group of industrialized nations, could have taken the role of disinterested outsider that UNEP could, to bring about, in this way, cooperative efforts by all the rich and poor nations surrounding the regional seas.

Admittedly UNEP has not been as efficient as could be desired, and like any international body it is subject to squabbles among interest groups of various countries. But it is doing important work; and if it were allowed to die or to become impoverished and moribund, it would only have to be recreated later at greater expense, after wasteful delay.

If positive efforts such as those of the last decade can be continued, the growing complexity of environmental problems can be dealt with by appropriate international cooperative programs. But the initiatives of UNEP are threatened now by the present administration's plans to drastically curtail financial support for the program. U.S. funding has always been the largest single contribution and is therefore crucial. In a world where the interdependence among nations, and the interrelationships among problem areas, such as economic development, population and natural resources, are becoming steadily more clear, support for UNEP must be increased not decreased. This is exactly the wrong time to question the need for broad international cooperation, and instead to rely on cumbersome treaties among a few nations on individual issues.

We hope these hearings result in a spotlight on the need for UNEP. The central fact is that these issues are all interrelated, that as nations we are all interdependent, and no simple single solution will ever be available. But UNEP can be a part of the solution with continued U.S. support.

APPENDIX 3

STATEMENT OF THE ENVIRONMENTAL POLICY CENTER, SUBMITTED BY MARION HERRINGTON

The Environmental Policy Center appreciates this opportunity to submit its views to the Subcommittee on Human Rights and International Organizations concerning the Administration's proposals for Fiscal Year 1983. The Center is a non-profit organization concerned about the proposed reduction in appropriated funds to the U.N. Environment Programme (UNEP). While in the past the U.S. has contributed $10 million to UNEP, the President's proposal for FY 83 stands at a mere $3 million. Such a reduction would undoubtedly be devastating to UNEP's ability to carry out effective direction of its programs.

It is out of concern over the fate of UNEP that the Center submits this statement for the public record. We wish to bring to the attention of the Subcommittee the specific accomplishments of UNEP which--wide-ranging as they are--have not been highly publicized. These include programs relating to human health, ecosystems, oceans, energy and economic development. It is equally important to note that U.S. participation in helping UNEP carry out these programs has not only been vital to UNEP's success to date, but is also in the economic, political and environmental interests of this country.

What is UNEP

The establishment in early 1973 of the U.N. Environment Programme reflected a world-wide recognition of the environmental costs incurred as a result of post-war prosperity. Born out of the 1972 Stockholm Conference on the Human Environment, UNEP today has a considerable mandate to identify and help assess environmental problems, and catalyse and coordinate action which promotes environmentally sound development in all sectors. It works in close cooperation with the entire U.N. family, national governments, non-governmental organizations, and members of the scientific and industrial communities, stimulating joint action to protect the world's resources. While it recognizes the need for individual countries to assume the financial responsibility for economic development, UNEP plays an essential supporting role in that, through its Environment Fund, it initiates activities which can be supported by other organizations at a later stage. This catalytic role is enhanced by the establishment of regional trust funds to which national governments make special contributions for activities of particular interest to them.

U.S. Role in UNEP

From the initial stages of establishment of the Programme in 1972, the U.S. has played a key role in helping provide the financial means which allow UNEP to carry out its work. During the years from FY 73 to FY 81, the U.S. made an annual contribution of $10 million, approximately 30% of the UNEP budget. As the Administration's International Development Cooperation Agency points out in its Congressional Presentation for FY 83, "U.S. interest in protecting and maintaining the global environment is effectively served by UNEP. The organization provides an instrument through which other countries and we can stimulate action in the UN system on problems of global dimensions...UNEP's multilateral approach is the strongly preferable means of preventing duplication and orchestrating international action. UNEP's encouragement of international environmental activities aids the competitive stance of U.S. business which must meet higher domestic environmental standards. It also benefits U.S. industries which supply pollution control equipment." (p. 22).

While praising the efforts and accomplishments of UNEP, however, the Administration has proposed to reduce the U.S. contribution to the organization by 61%. Such an action blatantly contradicts the United States' declared commitment to UNEP and its goals. In a year in which UNEP foresees the need to increase its budget by approximately $60 million, the United States' desire to reduce its contribution is extremely untimely. While the lack of U.S. support would directly affect UNEP's activities, it could also trigger similar reductions on the part of other countries--developed and developing--who have recently begun to assume more of the financial responsibility for UNEP.

UNEP Focus on Development and the Environment

Underlying all of UNEP's programs is the recognition that sustainable long-term growth can only be achieved if development is accompanied by the application of sound environmental practices. Almost from its inception, UNEP has tried to encourage and maintain the link between sound environmental principles and the economic and social well-being of the human population. Its activities are geared to helping meet basic human needs through prudent management of natural resources. The UNEP Industry and Environment Office develops and promotes the application of criteria for safe industrial practices where the planning and operation of plants and development of technology are concerned. It also reviews the implications of particular industrial activities, collates national legislation and policies on environmental practices and promotes the development of low and non-waste technologies. Perhaps UNEP's biggest achievement was the catalytic role it played in bringing together nine multilateral finance institutions in the signing of the Declaration of Environmental Policy and Procedures Relating to Economic Development in 1980. The Declaration signifies a recognition by these finance organizations of the importance of incorporating environmental considerations into development projects and policies. It also provides for technical assistance and research to improve methodologies for project appraisals, including cost/benefit analysis.

UNEP at Work

In accordance with the Action Plan formulated during the 1972 Stockholm Conference, UNEP works to achieve three basic objectives: Environmental Assessment, development of techniques for Environmental Management, and Supporting Measures in the areas of training and education. UNEP integrates these three components into the development of its programs of action.

EARTHWATCH

The Earthwatch Programme was established to carry out UNEP's assessment objective. As an international surveillance network, it provides the data base and information system necessary for monitoring and assessment of environmental conditions and changes. Its three main components consist of the Global Environmental Monitoring System (GEMS), the International Register of Potentially Toxic Chemicals (IRPTC), and the International Referral System (INFOTERRA).

GEMS

The contribution of GEMS is in improving the quality, quantity and flow of information on the varying state of the earth's environment. Its internationally coordinated data collection system aims at use of uniform, standardized measurements. This permits more meaningful comparisons and evaluations by regional or national planners. It also responds to the need for development of long-term projections of trends in the environment. Some of the specific activities of GEMS include:

Soils: the FAO/UNEP-sponsored *World Assessment of Soil Degradation Project* which undertakes tests related to selected environmental conditions and develops criteria for monitoring soil degradation.

Air Pollutants: the UNEP/UNESCO/WMO-sponsored *Background Air Pollution Monitoring Network* (BAPMoN) which consists of over 100 stations and provides information on long-term changes in the composition of the atmosphere. In cooperation with the Economic Commission for Europe, UNEP has also organized a system for monitoring of the long-range transport of pollutants. Data and chemical analysis centres located in Oslo and Moscow collect samples from 60 stations in 16 countries for study of the atmospheric transport of air masses in Europe. Another project being carried out in cooperation with WMO and WHO has collected data from monitoring of air pollution in urban areas. 200 stations in 50 cities have so far been involved in this project.

Water Quality: development of a water quality monitoring network which will eventually comprise 400 stations. In 1981 it started publishing data.

Ecosystems: the ecological monitoring of ecosystems which provides for collection and dissemination of current information on vegetation cover, soil conditions, population distribution and availability of water resources.

IRPTC

The International Register of Potentially Toxic Chemicals is a major source of data on the characteristics and potential hazards posed by many of the thousands of chemicals produced each year. Because much of the existing information about the nature of chemicals in common use today is fragmented, the IRPTC provides an invaluable service. Working through a network of national correspondents from industry, government and academia, the IRPTC facilitates access to data on the effects and hazards of chemicals, identifies gaps in existing knowledge and outlines areas for further research. Equally important is its dissemination of information on national, regional and global policies, regulatory measures and standards concerning oversight of potentially toxic chemicals. The fully operational Programme Activity Centre in Geneva acts as a focal point for collection and analysis of data contributed by the 90 member nations, numerous UN agencies such as FAO, ILO and WHO as well as by the other Earthwatch programs. Its recent accomplishments include:

--publication of data profiles covering 17 attributes of 60 different chemicals. Profiles for an additional 250 chemicals are being developed.

--initiation of a UNEP Industry and Environment Office/Pollution and Human Task Force-coordinated project to draft guidelines for the transfrontier transport and disposal of hazardous wastes.

--cooperation with the Chemicals Group of the OECD on information exchange procedures and chemical testing programs.

- --implementation of a USSR/UNEP project providing for the transfer of data on chemicals and the formulation of toxicological data sheets for chemicals on trade.

- --development of a UNEP/ILO coordinated international occupational safety and health hazard alert system for hazardous chemicals.

INFOTERRA

The International Referral System was established in 1976 in response to an increasing world demand for accurate, quality information on environmental planning, development, technology and science. INFOTERRA acts as a switchboard to direct environmentally related questions to the appropriate sources. Its International Directory of Sources lists 9,000 sources of information from 77 countries concerning over 1,000 topics. Approximately half of these sources are located in developing countries. The system has been designed with flexibility to allow access to many different types of inqueries. Information may be obtained for environmental management and policy planning as well as for more scientific and technical use. As a result of the INFOTERRA network, governments, institutions and private organizations have been able to improve the quality of decisions concerning environmental issues because of easier access to information. In China, consultation with INFOTERRA on means of abating the level of noise pollution in urban areas gave government officials the information they needed to establish necessary standards. In India, INFOTERRA referred officials to the appropriate sources for information on the legislative and administrative aspects of environmental protection. This led to the creation of a Department of the Environment.

Environmental Management in Areas of Concern

While Earthwatch fulfills the goal of environmental assessment, UNEP also devotes much attention to rational management of world resources. As a result of its assessment activities, UNEP has gained increasingly sophisticated knowledge of environmental problem areas, and thus, is able to initiate projects designed to alleviate threats to the environment. The success of these projects lies in UNEP's ability to bring together governments, international and private organizations and industry in a spirit of cooperation. This is evidenced by the fact that many of the programs sponsored by UNEP are regional in nature and funded on a multilateral basis.

HUMAN AND ENVIRONMENTAL HEALTH

Since the 1972 Stockholm Conference, it has become clear that the question of human health is inescapably linked to the health of the living environment itself. It is for this reason that UNEP places the issue of human and environmental health among its top priorities. To alleviate the problems of malnutrition, infectious diseases, and health hazards caused by radioactive substances, toxic chemicals and pollution, UNEP promotes adoption of waste management techniques, recycling, safe disposal of chemical and toxic residues and rational planning of human settlements. Some of its specific activities include:

- --the WHO/ILO/FAO/UNEP-sponsored International Programme on Chemical Safety which formulates health criteria concerning contact with chemicals, provides training in toxicology and sets guidelines for limits to exposure.

- --the WHO/UNEP Environmental Health Criteria Programme which provides information on chemical agents and their effects. 300 substances have been examined for carcinogenic risk and documents have been published on the characteristics of 15 specific pollutants.

- --a memorandum of understanding between UNEP and the UN Centre on Human Settlements providing for the establishment of guidelines on the environmental aspects of human settlements planning.

--the UNEP Task Force on Pollution and Human Health which works in cooperation with WHO, FAO, ILO, UNDP and national governments to promote the reform of policies which have in the past hindered the remedy of human health problems such as malnutrition and infectious diseases.

TERRESTRIAL ECOSYSTEMS

In addressing the complexity of issues related to ecosystems, UNEP considers a wide range of areas including arid and semi-arid lands, tropical forests, islands and coastal areas, soil, water and air, and genetic resources. Concern about the threats posed by over-grazing, over-cultivation, improper irrigation, exploitation of plant and animal resources, pesticide use, and air and water pollution has led to considerable action on the part of UNEP. Working in cooperation with a variety of UN agencies, non-governmental organizations and national governments, UNEP has initiated programs designed to safeguard atmospheric quality, ensure proper management of water resources, maintain the biological stability of the planet's life support capacity, and reverse the trends toward deforestation and desertification. The following gives an overview of UNEP's work in these areas.

Soils: UNEP has taken a leading coordinating role in the implementation of the UN Plan of Action to Combat Desertification. In 1980, UNEP sponsored several international desertification training courses in the USSR for 39 specialists from 15 developing countries. It continues to assist the UN Sudano-Sahelian Office in implementing desertification projects, including massive tree-planting, in 19 African countries. UNEP has also been working with the Organization for African Unity on development of an hydroelectric map of Africa. In addition, the UNEP/FAO/UNESCO Task Force develops guidelines for international soil classification and establishes criteria for soil capabilities.

Forests: Over-exploitation of tropical forests and woodlands has recently been recognized as a growing problem, especially in developing countries. By the end of the century, the per capita amount of potentially exploitable timber will be cut in half if the current rate of deforestation continues. The already existing problems of erosion, desertification, flooding, siltation and species extinction are only aggravated by this over-use. To help overcome these problems, UNEP, in collaboration with FAO, has been involved in world-wide assessment of tropical forest resources. Surveys of Africa, Latin America and Asia have already been concluded. A pilot study of tropical forests in three West African countries has also been undertaken to formulate methods for production of an inventory of forest cover. In addition to assessment activities, UNEP sponsors training and management projects to help developing countries implement sound management practices.

Water Resources: UNEP has developed a System-Wide Medium-Term Environmental Plan for 1984-89, the realization of which will be an essential contribution toward the application of environmentally sound water management techniques. In the meantime, the UNEP Water Task Force has worked with various UN agencies including UNICEF, UNDP and WMO in implementing demonstration projects in Swaziland, the Upper Nile River, the Euphrates and the Lower Mekong River basins. The projects are designed to help local inhabitants learn basic water management methods and are models for wider application.

Atmosphere: There has been considerable concern recently over the possible consequences of increased atmospheric carbon dioxide. In 1979, the World Climate Programme was established to examine this issue. As part of the Programme, UNEP, in conjunction with WMO and the International Council of Scientific Unions, called together a group of experts to assess the role and impact of CO_2 on climate variations and publish a statement on the issue. In addition to initiating climate impact studies, the World Climate Programme is working to find ways to reduce the vulnerability of food systems to climatic changes. UNEP has taken a leading role in the research aspect of the Programme with its analysis of changes in the Earthwatch system. In another area concerning the atmosphere, UNEP's Coordinating Committee on the Ozone Layer has brought together representatives of private industry, governmental research bodies and international organizations to discuss the dimensions of the threat to the ozone layer. In an attempt to accelerate international cooperation, the CCOL has initiated the drafting of a global convention for the protection of the ozone layer.

Genetic Resources: In 1980, UNEP helped launch the World Conservation Strategy to stimulate a more focused approach to the management of living resources. The Strategy's objectives include raising public and scientific consciousness regarding the importance of genetic resources preservation providing information on genetic resources including crop plants, wildlife, fish and microbial species, and developing the means to sustain the diversity of genetic resources. The World Data Centre on Micro-Organisms in Australia collects information from 64 countries on almost 25,000 microbial strains, monitors their status and assists in the relocation of genes. Similar data bases and gene banks for animal, fish and forest resources are being established. UNEP's five pilot microbiological resource centres have issued catalogues of regional collections. Training courses and workshops on environmental applications of micro-organisms have been held in Tripoli, Brisbane, Belgrade, Cairo and Bangkok. The Man and the Biosphere Programme, sponsored by UNEP and UNESCO now involves over 100 countries and has plans under way for the establishment of crop plant and genetic resources gene banks. UNEP has also played a major role in implementing the 1973 Convention on International Trade in Endangered Species (CITES) of which the U.S. was a main creator.

OCEANS

Oceans cover 71% of the world's surface. This vastness has largely contributed to the myth that the oceans have an infinite diluting capacity, and that, therefore, they can be considered a huge dumping ground for man's waste. This assumption has proved wrong and ocean pollution is becoming a serious problem. While the environmental problems of the ocean are global in scope, a regional approach to solving them has proved to be more effective. Such has been the case with the UNEP Regional Seas Programme. Beginning in 1975 with the Mediterranean Action Plan, the Programme has grown to include four seas, four more regions in the final preparatory stages, and an additional two more being planned for 1983. The Mediterranean Action Plan has resulted in several international agreements concerning pollution, ocean dumping and oil spills. The Oil Combating Centre in Malta works with 84 institutions in 16 countries on monitoring the level of pollutants in the Mediterranean, initiating research on the effects of pollution on the marine environment, and exchanging data on oil pollution control techniques. In 1981, participating countries in the Programme agreed on a $12 million three year budget to continue its activities.

A similar plan of action for the wider Caribbean region was adopted in 1981. 26 states, including the Gulf states of Texas, Mississippi, Louisiana, Alabama and

Florida have joined the Plan which will focus not only on protecting the environment, but also on reconciling development and environment objectives. The Action Plan contains 66 specific projects related to oil spills, marine pollution, protection of marine environments and establishment of science laboratories in the less developed countries. To finance them, a sum of $8.2 million is to be raised over a period of three years, 1981-83. While countries such as France, Mexico, Venezuela, Colombia, Cuba and Haiti have pledged funds to the Programme, the U.S. has to date declined to contribute. In view of the United States' declared interest in the basin's economic progress, and given the benefit of pollution control which it brings to the U.S. and its neighbors, the Caribbean Region Plan is extremely important and should be allotted funds in the FY 83 budget.

Concern over deterioration of their common sea and coastline led Bahrain, Iran, Iraq, Kuwait, Oman, Quatar, Saudi Arabia and the United Arab Emirates to agree on two treaties and an Action Plan in 1978. Coordinated efforts concerning the Red Sea have also been undertaken. Plans for the West African, South-West Pacific, South-East Pacific and East Asian regions are nearing completion. Studies on the effects of coastal engineering and the development of waste management techniques have already been completed. UNEP plans to initiate action in the East African and South-West Atlantic regions by 1983.

The Regional Seas Programme offers an excellent example of UNEP's role as an international arbiter, in that it has been able to define areas for cooperation between states characterized by great differences in political regimes, size, natural resource base and levels of development.

ENERGY

It has become clear in the last decade that energy supplies can no longer be regarded as cheap, expendable and inexhaustible. Dependence upon non-renewable fuels of finite supply must be supplanted by the development of a new mix of sources. In many developing countries the use of wood and other plant materials at a rate of up to 90% of fuel requirements has caused serious concern about the capacity of woodlands to regenerate. In an attempt to address these problems, UNEP's Energy Task Force has focused its attention on several facets of the issue. In addition to assessing the impact of various sources of energy--with an emphasis on solar, biogas, wind, geothermal and fuelwood charcoal--UNEP has organized training and research activities which promote the development of sound alternative sources of energy and conservation methods. Some examples of its work include:

--an active role in organization of the 1981 UN Conference on New and Renewable Sources of Energy (UNCNRSE). The conference promoted real cooperation between UN agencies and national governments, provided a forum for serious exchange of ideas on energy development, and generated proposals which emphasized joint action.

--sponsorship of two international workshops in 1981 devoted to rural development of small energy resources. These meetings took into account the findings and recommendations of UNCNRSE in outlining areas for energy research, development and action.

--initiation of pilot projects in Sri Lanka, the Philippines, Indonesia, Senegal and the Arab region. These experiments are designed to harness renewable sources of energy, including solar, biogas and wind, according to their suitability to each region. The project in Sri Lanka is the first of its kind to attempt integration of two different types of energy for storage in the same battery bank. Experiments such as these go a long way toward meeting the local energy needs of rural inhabitants in many developing countries.

In light of the recognized global problems of massive deforestation, erosion, pollution hazards, pesticide misuse and chemical wastes, there is an urgent need for continued support of an international environmental organization such as UNEP which identifies and addresses these problems. During a year which marks the tenth anniversary of the establishment of UNEP, it is appropriate that the past progress and future goals of UNEP be assessed. A reduction in funding of the magnitude proposed by the Administration, however, will not serve this purpose. Rather, it will likely set a dangerous precedent of little or no funding in future budgets. The U.S. should not abandon its support at a time when UNEP's efforts over the past decade are now beginning to bring results. The Environmental Policy Center, on behalf of the thousands of concerned citizens it represents, urges this Sub-Committee to maintain the U.S. contribution to UNEP at the level provided for in the 1981 International Security and Development Cooperation Act.

APPENDIX 4

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12 April, 1982

The Honorable
Donald Bonker
Chairman, Subcommittee
On Human Rights and International
Organizations
US Congress
House of Representatives
Washington, D.C. 20515

Dear Congressman Bonker:

I am the former director of the Global 2000 Report to the President and am writing to express my appreciation for the hearings you organized on March 30. It was a thoughtfully organized hearing, and I would appreciate you sending me a copy of the hearing transcript as soon as it is available.

I have prepared three papers[1] recently on topics related to your hearing, and am enclosing copies of the following:

1. "Foresight in the Federal Government: Perspectives from the Experience of Directing the Global 2000 Study;"
2. "The Global 2000 Report and its Implications for the United States;"
3. "Improving the Government's Capacity to analyze and predict conditions and trends of Global population, resources, and environment."

Part of my work now is organizing an international conference to be held at the Woodlands, Texas, November 6-10 on the subject of "Sustainable Societies: The Roles of the Private Sector." The enclosed newsletter provides some background information.

If I can be of any future assistance to you concerning the Global 2000 work, please give me a call.

Sincerely,

Gerald O. Barney

Gerald O. Barney

GOB:mk

Enclosures: as stated

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[1] A copy of these papers is on file with the Subcommittee on Human Rights and International Organizations.

APPENDIX 5

Congress of the United States
Committee on Foreign Affairs
House of Representatives
Washington, D.C. 20515

April 12, 1982

Honorable James L. Buckley
Under Secretary of State
for Security Assistance
Department of State
Washington, D.C. 20520

Dear Mr. Secretary:

As we discussed during your appearance before the Subcommittee on March 30, the Subcommittee would like to request your response to additional questions. Your responses should be brief (no more than one page each) and they should be received by the Subcommittee no later than May 14 so that they can be published with the hearing record. The questions are as follows:

1) A December 1981 Report by the OECD Environment Committee discussed the need to expand the definition of national security to include global environmental risks. What is your view of this suggestion?

2) On pages 12-14 of your prepared statement, you set forth international environmental priorities for the future. What criteria were used in setting these priorities and which Government agency assisted in formulating the priorities?

3) Do you endorse the priorities set forth in the 1980 World Conservation Strategy?

4) On page 9 of your prepared statement, you recognized UNEP's difficulties in coordinating its activities with U.N. Specialized Agencies, like FAO and UNESCO. How can the U.S. help to improve coordination among U.N. agencies on environmental issues?

5) Do you believe UNEP's staff size is adequate to fulfill its mandate, or should the scope of activities in which UNEP is involved be more limited?

6) Do you believe the State Department and its Bureau of Oceans, International Environmental and Scientific Affairs in particular should continue to exercise leadership in formulating the U.S. Government's positions on global environmental issues?

7) What follow-up is planned to the 1981 Interagency Strategy Conference on Biological Diversity?

Honorable James L. Buckley
April 12, 1982
Page 2

8) The U.N. is presently negotiating a Code of Conduct for Transnational Corporations which includes a section on environmental protection, and the OECD is discussing the inclusion of environmental standards in its 1976 Guidelines for Multinational Enterprises. What is your view of these two proposals?

9) Many experts have noted that unless population growth is reduced, there is little chance of resolving some of the most urgent global environmental problems. Why was the relationship between population and the environment ommitted from your prepared remarks?

10) You have been asked to conduct a review of the relationship between population change and socio-economic development in the Third World. Who initiated this request; what is the current status of your review; and to whom will the results be reported?

I very much appreciated your excellent testimony and wish you every success in leading the U.S. Delegation to the Nairobi Conference.

With best wishes,

Sincerely yours,

Don Bonker

Don Bonker, Chairman
Subcommittee on Human Rights
and International Organizations

DB/cgs

APPENDIX 6

DEPARTMENT OF STATE
Washington, D.C. 20520

MAY 24 1982

Dear Mr. Chairman:

I am replying to your letter of April 12 to Under Secretary Buckley in which you requested responses to supplemental questions for the record of his March 30 appearance before your Subcommittee.

Replies to your questions are enclosed.

I hope this additional material will be of assistance to you and the other members of the Subcommittee.

Sincerely,

Powell A. Moore

Powell A. Moore
Assistant Secretary for
Congressional Relations

Enclosures: Responses to Supplemental Questions.

The Honorable
Don Bonker, Chairman,
Subcommittee on Human Rights
and International Organizations,
Committee on Foreign Affairs,
House of Representatives.

Q: A December 1981 Report by the OECD Environment Committee discussed the need to expand the definition of national security to include global environmental risks. What is your view of this suggestion?

A: As I noted in my testimony, we are convinced that economic development which assures the sustainability of the resource base is the key to improving the human condition worldwide. It seems clear that to the degree we succeed in this effort we will also contribute to a more stable and less tense world situation. Certainly our bilateral assistance strategy recognizes a link between the institutional, structural and resource aspects of economic problems and their potential for creating social and economic instability, and is directed to combating them. The same principle is also embodied in Section 118 of the International Security and Development Act of 1981. So, although we prefer to keep the focus more on human concerns and what President Reagan called "the universal quest for a higher standard of living and resolution of global issues of transcending importance to all nations," there are implications in environmental/resource problems which bear directly on our long-term security.

Q: On pages 12-14 of your prepared statement, you set forth international environmental priorities for the future. What criteria were used in setting these priorities and which Government agency assisted in formulating the priorities?

A: The environmental problem areas I mentioned are all intrinsically important, of global or regional significance and susceptible to improvement through international cooperation. Thus, they all appear entirely appropriate to be addressed in the UNEP context. We have considered the matter of priorities at length within the Global Issues Work Group chaired by CEQ, and also have vetted them in the State-chaired Committee on International Environmental Affairs (CIEA) on which 23 agencies and departments are represented. Discussions have also been held with the members of concerned non-governmental organizations, and with our allies.

Q: Do you endorse the priorities set forth in the 1980 World Conservation Strategy?

A: We think the Strategy is a very valuable report, which properly articulates the close relationship between the conservation of living resources and sustainable development. Given its broad scope and large number of "priorities", it does not provide an exact formula or blueprint for action which can be readily adopted and followed by the U.S. or any other country. Nonetheless, we are using the Strategy within the State Department as an important planning document, as are other Government agencies. Moreover, we believe a good correlation exists between US efforts over the past 10 years and our evolving priorities in the natural resource and environmental fields, and the priorities set forth in the Strategy.

Q: On page 9 of your prepared statement, you recognized UNEP's difficulties in coordinating its activities with UN Specialized Agencies, like FAO and UNESCO. How can the US help to improve coordination among UN agencies on environmental issues?

A: At the upcoming UNEP Governing Council, the proposed System-Wide Medium Term Environment Plan (SWMTEP) for the years 1984-89 will be considered. The SWMTEP constitutes a comprehensive program for organizing environmental activities within the entire UN system into program areas, thereby identifying available resources and areas in which coordination among agencies needs to be established or improved. The US has supported the developmment of SWMTEP because its is a major step not only towards improving coordination between UNEP and other UN agencies such as FAO and UNESCO, but also because, if properly executed, the Plan could greatly enhance UNEP's effectiveness by focusing program effort on highest priority projects.

Q: Do you believe UNEP's staff size is adequate to fulfill its mandate, or should the scope of activities in which UNEP is involved be more limited?

A: We consider that modest reductions could be made in UNEP's overall staff size. Even without this, reallocation of certain positions could help it meet program priorities more efficiently within its present mandate. We do not favor significant changes in UNEP's catalytic and coordinative role although we believe it should restrict its activities to the environmental aspects of global problems. It also ought not to become involved in development assistance activities. UNEP's current staffing problems do cause us some concern because of the need for increased professional capability. According to our latest information, roughly a third of UNEP's staff positions are now vacant.

Q: Do you believe the State Department and its Bureau of Oceans, International Environmental and Scientific Affairs in particular should continue to exercise leadership in formulating the US Government's positions on global environmental issues?

A: We have performed this role since January 1970, when the first Office of Environmental Affairs was established in the State Department, and still believe it is an appropriate function for the Department. We exercise it, of course, under general environmental policy developed in concert with the Council on Environmental Quality. Foreign policy interests are intimately involved in issues of this kind, and the Department has the responsibility for coordinating US positions in international organizations. Naturally, due to the breadth of the subject matter a wide range of agency expertise needs to be mobilized and brought to bear, but we think the Department--and the OES Bureau--can usefully continue to lead in harmonizing often diverging technical agency views and interests and achieving concerted positions within the Government.

Q: What follow-up is planned to the 1981 Interagency Strategy Conference on Biological Diversity?

A: The Conference Proceedings are now being printed and will be distributed widely both here and overseas by late May or early June. This should focus even more attention on the subject and stimulate and guide follow-on activities. The Department of State already has been approached by several agencies which participated in the Conference regarding review of the recommendations with a view to possible modifications in programs within their specific areas of responsibility. We intend to convene a meeting of all participating agencies before mid-summer to seek additional, practical recommendations regarding follow-up.

As in the case of our similar Strategy Conference on Tropical Deforestation, which was convened in 1978, we anticipate that the catalytic effects of this meeting and the detailed discussions of the problems and resultant recommendations will support assessment and planning efforts on both the domestic and international planes for a number of years. As many attendees noted, this was an essential "first step" that will not have to be repeated; we can now apply recommendations from US and foreign experts on a continuing basis whenever and wherever genetic diversity issues require a public policy response.

Q: The UN is presently negotiating a Code of Conduct for Transnational Corporations which includes a section on environmental protection, and the OECD is discussing the inclusion of environmental standards in its 1976 Guidelines for Multinational Enterprises. What is your view of these two proposals?

A: The brief section on environment in the proposed Code of Conduct calls upon transnational corporations to conduct their business in accordance with national environmental laws and regulations, to provide information on possible environmentally harmful aspects of their activities to competent national authorities and to cooperate with international organizations for the protection of the environment.

Since this Code of Conduct is to be voluntary, the proposals appear consistent with our policy and sufficiently broad that they should neither impede development nor prejudice the interests of multinational companies. At the same time the Code does establish basic principles to guide environmentally sound practices by transnationals. As a result of this balance, we support this aspect of the proposed Code. It must be emphasized, however, that our support for the environment section is predicated on the Code being voluntary, and in any case does not imply approval of the whole Code, on which negotiations are still in progress.

On the second question, at the OECD Environmental Committee meetings last December, it was agreed that discussions on environmental guidelines were to be postponed.

Q: Many experts have noted that unless population growth is reduced, there is little chance of resolving some of the most urgent global environmental problems. Why was the relationship between population and the environment omitted from your prepared remarks?

A: It's a matter of emphasis. Population problems are best addressed through effective development programs--hence, the importance of the Administration's development assistance proposals. In the meantime, we need to deal with the impact of population pressures on the environment through better planning and management based on the specific problems to be resolved. For example, the destruction of tropical forests for fuel or to clear land for crops can be addressed in a variety of ways such as better regulation and protection of areas set aside for preservation accompanied by the development of faster growing trees as a reusable source of firewood and the identification of a variety of commercially exploitable forest products which can be culled without the wholesale destruction of the forest itself. Whatever the strategies for reducing the rate of population growth, it is the challenge of environmentalists to develop more effective ways to protect essential values in a world which over the next few years will have to accommodate a significantly larger human population under anyone's scenario.

Q: You have been asked to conduct a review of the relationship between population change and socio-economic development in the Third World. Who initiated this request; what is the current status of your review; and to whom will the results be reported?

A: I was asked to review US international population policies by former Deputy Secretary of State William Clark. I expect to be submitting my recommendations to the Secretary of State in the near future.

APPENDIX 7

CLEMENT J. ZABLOCKI, WIS., CHAIRMAN

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JOHN J. BRADY, JR.
CHIEF OF STAFF

Congress of the United States
Committee on Foreign Affairs
House of Representatives
Washington, D.C. 20515

April 12, 1982

Honorable Peter McPherson
Administrator
Agency for International Development
320 - 21st Street, N.W.
Washington, D.C. 20523

Dear Mr. McPherson:

As we discussed during your appearance before the Subcommittee on March 30, the Subcommittee would like to request your response to additional questions. Your responses should be brief (no more than one page each) and they should be received by the Subcommittee no later than May 14 so that they can be published with the hearing record. The questions are as follows:

1) During your testimony, you agreed to review the possibility of the U.S. providing a contribution of some $500,000 to the UNEP-sponsored Regional Seas Program for the Caribbean. What are the conclusions of your review?

2) The U.S. provides nearly $70 million annually in bilateral aid to Caribbean nations, and the Administration is requesting $350 million in FY 1983 for the Caribbean Basin Initiative. What portion of these amounts is or will be devoted specifically to environment and natural resource projects?

3) What has AID done to implement the Congressional directives set forth in the 1981 amendments to Section 118 (Environment and Natural Resources) of the Foreign Assistance Act in the area of tropical forestry?

4) In the Administration's proposed FY 1983 foreign aid request, the forestry and natural resource account is slated for $1 million reduction, from $3.25 to $2.25 million. Which projects and staff will be affected by the proposed reduction?

5) To what extent does AID use cost-effectiveness analysis and risk-benefit analysis in its environment and natural resource project formulation?

6) What is the current status of U.S. funding for the International Center for Research in Agro-forestry in Nairobi?

Honorable Peter McPherson
April 12, 1982
Page 2

7) You commented on page 20 of your prepared statement about the UNESCO Man and the Biosphere Program. What is the current status of U.S. funding for the MAB program?

I very much appreciated your excellent testimony, and look forward to working with you on these important issues in the future.

With best wishes,

Sincerely yours,

Don Bonker, Chairman
Subcommittee on Human Rights
and International Organizations

DB/cgs

APPENDIX 8

RESPONSES OF MR. MCPHERSON TO QUESTIONS SUBMITTED IN WRITING BY SUBCOMMITTEE CHAIRMAN BONKER

QUESTION: During your testimony, you agreed to review the possibility of the U.S. providing a contribution of some $500,000 to the UNEP-sponsored Regional Seas Program for the Caribbean. What are the conclusions of your review?

ANSWER : We are allocating $300,000 of FY 1982 funds which is to be used to address important elements of the UNEP Regional Seas Program's Action Plan for the Caribbean Environmental Program. To maximize the benefits, we have decided to spend this money directly on two projects rather than transferring it to the Action Plan's general fund.

Preliminary agreement has been reached to contribute $60,000 to the OAS to finalize the Caribbean Oil Spill Contingency Plan. This completes element APCEP 9/1 of the Action Plan. This element is considered by the countries of the Caribbean to be in their highest category of priority.

We are currently reviewing several alternative uses for the remainder of the funds. While we have not at this moment decided on the target activities, we are considering possible funding to address the following needs: watershed management training needs, applied forestry research and technical assistance outreach, mangrove management, scientific and technical cooperation for coastal resource management and demonstration of appropriate technologies for aquaculture. Our assessment of potential target activities will be concluded on or about June 1, 1982. We will be pleased to inform you of the final decision at that time should you desire.

QUESTION: The U.S. provides nearly $70 million annually in bilateral aid to Caribbean nations, and the Administration is requesting $350 million in FY 1983 for the Caribbean Basin Initiative. What portion of these amounts is, or will be, devoted specifically to environment and natural resource projects?

ANSWER : Through FY 81 the LAC Bureau obligated $38,953,000 and expended $4,684,000 on purely environmental and natural resource projects. Estimated FY 82 obligations are $8,850,000 with expenditures estimated at $11,340,000. Proposed FY 83 obligations and expenditures are $5,981,000 and $12,429,000, respectively. These figures represent eight projects for Costa Rica, Dominican Republic, Haiti, Honduras, Panama and Regional accounts.

The Administration's requested supplemental appropriation of $350 million in FY 82 for the Caribbean Basin Initiative is needed to address urgent balance-of-payment deficits in the region and, while this use of these funds is essential to allow longer-term development projects to proceed, the funds themselves are not destined for such projects.

ENVIRONMENT

Q: What has AID done to implement the Congressional directives set forth in the 1981 Amendments to Section 118 (Environment and Natural Resources) of the Foreign Assistance Act in the area of tropical forestry?

A: In furtherance of the directive to provide leadership and extend cooperation, AID has initiated discussions with the World Bank, the International Union of Forestry Research Organizations and the Food and Agricultural Organzation of the United Nations (FAO) toward the creation of an international forestry research secretariat to ensure a more effective participation of LDCs in forestry research and dissemination. AID has also encouraged the U.S. delegation to the May 1982 FAO Committee on Forestry to seek the design of a coordinated international approach to improve management of tropical forests including a more clear and efficient division of labor among U.N. agencies. This recommendation is a follow-up to the second experts' meeting on forestry (January 1982) co-sponsored by FAO, UNEP and UNESCO.

Q: To what extent does AID use cost-effectiveness analysis and risk-benefit analysis in its environment and natural resource project formulation?

A: Environment and natural resource type projects are subject to the same requirements of analysis and review as other AID development activities. This includes economic, social, technical and environmental impact analyses. In the case of water and related land resources projects which often contain natural resource management components, further requirements for soundness analysis are imposed by Section 611(b) of the Foreign Assistance Act as amended. In the case of these activities, AID has prepared guidance to effectively integrate economic feasibility, social soundness, technical feasibility and environmental analysis. The approach followed is a modification and adaption of the Planning and Standards for water and related land resource planning of the Water Resources Council that takes into account the realities of AID borrower/grantee countries institutions and project development procedures.

REDUCTION IN FY 1983 REQUEST FOR OFFICE OF FORESTRY, ENVIRONMENT, AND NATURAL RESOURCES

QUESTION: In the Administration's proposed FY 1983 foreign aid request, the forestry and natural resource account is slated for $1 million reduction from $3.25 to $2.25 million. Which projects and staff will be affected by the proposed reduction?

ANSWER: The account referred to is for the Office of Forestry, Environment and Natural Resources in the Science and Technology Bureau. Originally both FY 1982 and FY 1983 levels were planned to be at the same level, $2.25 million. During this year (FY 1982) it was decided to initiate a new project in agroforestry that will require funding of $1,000,000 this year.

Neither the project portfolio nor the staffing level will be affected by the lower FY 1983 level.

STATUS OF U.S. FUNDING FOR ICRAF

QUESTION: What is the current status of U.S. funding for the International Council for Research in Agroforestry (ICRAF) in Nairobi?

ANSWER: A.I.D. plans to provide $1,000,000 to ICRAF for an agroforestry research and training project. This obligation is expected to take place in August or September of this year.

UNITED STATES MAN AND THE BIOSPHERE (MAB) PROGRAM

QUESTION:	You commented on page 20 of your prepared statement about the UNESCO Man and the Biosphere Program. What is the current status of U.S. funding for the MAB Program?
ANSWER:	The U.S. MAB National Committee is supported by a small secretariat. The Department of State provides office space, administrative support and assigns a foreign service officer as the Executive Director. A U.S. MAB Consortium, composed of the USDA Forest Service (USFS), the United States Department of the Interior National Park Service (NPS) and the Fish and Wildlife Service supports applied research within selected MAB project areas. It funded seven small research proposals in 1979 ($350,000), 16 in 1980 ($800,000), and 10 in 1981 ($500,000). One hundred and thirty-eight proposals have been received this year and are now under review. The USFS and the NPS will provide a total of $250,000 which allows the funding of four of these proposals. In addition, A.I.D. has requested the U.S. MAB Program to review and implement activities on specific environmental and natural resources problems responsive to A.I.D. and LDC needs. These activities involve the preparation and presentation of training courses and the preparation of "Environmental Profile" documents on A.I.D.-supported LDCs. In FY 1982, funding for these activities will be $200,000.

APPENDIX 9

CLEMENT J. ZABLOCKI, WIS., CHAIRMAN

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HENRY J. HYDE, ILL.

JOHN J. BRADY, JR.
CHIEF OF STAFF

Congress of the United States
Committee on Foreign Affairs
House of Representatives
Washington, D.C. 20515

April 12, 1982

Mr. A. Alan Hill
Chairman
Council on Environmental Quality
722 Jackson Place
Washington, D.C. 20006

Dear Mr. Hill:

As we discussed during your appearance before the Subcommittee on March 30, the Subcommittee would like to request your response to additional questions. Your responses should be brief (no more that one page each) and they should be received by the Subcommittee no later than May 14 so that they can be published with the hearing record. The questions are as follows:

1) During the hearing I asked you to provide the Subcommittee with a breakdown of projects and issue areas of which CEQ is divesting itself and the agencies to which they are being assigned. Would you please provide us with this list?

2) How many professional, full-time CEQ staff are devoted uniquely to global environmental issues and what is their background in global environmental affairs?

3) Has the Global Issues Work Group reached agreement on any issues, and what is your timetable for developing a program of action?

4) Have nongovernmental organizations been invited to participate in the Global Issues Work Group, and, if not, do you intend to invite them to participate?

5) A 1980 report prepared for CEQ found that the Federal Government and private interests are not doing enough to prevent the loss of species diversity. Do you share this view?

6) In your prepared statement you mentioned that "private ownership and free markets are the best institutions to avoid the 'tragedy of commons' and to protect the interests of future generations." Does this statement apply to each of the broad issue areas covered in the Stockholm Plan of Action -- i.e., the oceans, atmosphere, terrestrial resources?

I appreciated your testimony before the Subcommittee and look forward to working with you on these important issues in the future.

With best wishes,

Sincerely yours,

Don Bonker

Don Bonker, Chairman
Subcommittee on Human Rights
and International Organizations

DB/cgs

APPENDIX 10

EXECUTIVE OFFICE OF THE PRESIDENT
COUNCIL ON ENVIRONMENTAL QUALITY
722 JACKSON PLACE, N. W.
WASHINGTON, D. C. 20006

May 24, 1982

Honorable Don Bonker, Chairman
Subcommittee on Human Rights and
International Organizations
Committee on Foreign Affairs
U.S. House of Representatives
Washington, D. C. 20515

Dear Congressman Bonker:

The following information is provided in response to the questions in your letter of April 12, 1982.

1. In the past, CEQ has been involved in a number of issues. This involvement generally took the form of studies and reports either prepared by CEQ staff or under contract.

   During my tenure as Chairman, I intend to carefully focus the priorities of the agency. At this point we are undertaking the following specific activities:

   NEPA Oversight: We are developing guidance to the federal agencies on how to more efficiently comply with NEPA, especially the environmental impact statement process.

   Acid Deposition: We are coordinating the activities of the various agencies in developing the Administration's position on this issue.

   Global Issues: We established and chair the Global Issues Work Group to carry forward the work started under the Ford Administration and continued under the Carter Administration dealing with future global environmental issues.

   Certain tasks were undertaken by CEQ as experimental projects to see if they work. The best example is the UPGRADE system to develop an integrated environmental data base to which I made reference during the hearings. We initiated the UPGRADE system as an experimental project, and now that we have concluded that it is a viable system, we are moving it into the line agencies (EPA and the Geologic Survey) which use it directly.

2. The Council's global environmental affairs work is performed primarily by three individuals in addition to me. One is with us on an intergovernmental loan from the California Department of Food and Agriculture and is a plant pathologist who served as a policy advisor during the Reagan and Brown administrations in Sacramento. Another

is an independent contractor who has worked on a number of environmental land use issues. The third, also an independent contractor, is a lawyer by training with particular experience in international environmental law. He has served in a variety of international environmental capacities, governmental and nongovernmental, including as Director of International Activities for the National Audubon Society.

3. The Global Issues Work Group has met several times.

It has agreed upon a set of global environmental principles which will serve to guide U.S. Government policy. The principles were presented as part of the U.S. plenary statement at the UNEP Nairobi Session of a Special Character.

Under this lead of the State Department, the group is inventorying the full range of government activities in the area of environment, natural resources and population. This inventory covers international multilateral and bilateral agreement.

A third, current effort involves analyzing and critiquing the Global 2000 Report to determine other areas of appropriate government concern. Two studies are being completed to assist in this review.

A final activity involves formation of an interagency working level group to analyze current government data gathering and forecasting capabilities and, as appropriate, to recommend improvements.

To encourage maximum flexibility, I am keeping the Work Group's schedule as open as possible.

4. The Work Group is an exclusively governmental body. As our work progresses, we shall, however, be inviting the non-governmental community to share its views with us.

5. I believe the Federal Government has been a world leader in promoting the conservation of biological diversity. As the Subcommittee is aware, the State Department, AID and other agencies, including CEQ, co-sponsored the recent Conference on Biological Diversity. I expect these and other agencies, as appropriate, will be actively participating in the follow-up of conference recommendations.

6. I believe that private ownership is an effective means for protecting and preserving natural resources, in most instances. As is implicit in the question, there are obvious areas in which the concept does not easily apply.

Sincerely,

A. Alan Hill

A. ALAN HILL
Chairman

APPENDIX 11

LETTER FROM SUBCOMMITTEE CHAIRMAN BONKER TO HON. RICHARD FUNKHOUSER TRANSMITTING QUESTIONS FOR THE RECORD

COMMITTEE ON FOREIGN AFFAIRS,
HOUSE OF REPRESENTATIVES,
Washington, D.C., April 20, 1982.

Hon. RICHARD FUNKHOUSER,
Director, Office of International Activities, Environmental Protection Agency, Washington, D.C.

DEAR AMBASSADOR FUNKHOUSER: As we discussed during your appearance before the Subcommittee this afternoon, the Subcommittee would like to request your response to additional questions. Your responses should be brief (no more than one page each), and they should be received by the Subcommittee no later than May 21 so that they can be published with the hearing record. The questions are as follows:

1. What is the scientific basis for EPA's objections to the December 1981 OECD Directors' Workshop Report on the global environment?
2. What are the reasons for the Office of Federal Activities' Director serving as EPA's principal representative on the Global Issues Work Group?
3. Would you support the establishment in the U.S. of a clearing-house to minimize the conflicts between U.S. commercial interests and our global environmental interests for such issues as hazardous substances?
4. Would you list some specific examples of ways in which private enterprise and free market forces will attempt to decrease the risk posed to developing countries by the export of hazardous substances?
5. Is EPA acquiring any of the areas of which CEQ is divesting itself, and, if so, how does EPA intend to address them?
6. Did the U.S. use the opportunity provided by the OECD DAC meeting the week of April 19 to coordinate positions for the UNEP Session of a Special Character?
7. What is EPA's process for assuring that the views of industry, labor and citizen groups are taken into account in formulating EPA's positions on international chemical issues; specifically, what role do environmental and citizen groups play in this regard?
8. What is EPA's role in formulating policy in the area of hazardous chemicals, and how will EPA assure that U.S. leadership is not abandoned in this area?
9. What was EPA's recommendation on the OECD Expert Group Report that favored notices for banned chemicals, and what was the U.S. Government's position on this Report?
10. Why was the EPA representative to this OECD Expert Group meeting, who had attended two earlier meetings of the group, replaced at the last minute by a representative of the Commerce Department, and what was EPA's recommendation on changing our representative?

I appreciated your appearance before the Subcommittee this afternoon, and look forward to working with you and your staff on these important issues in the future.

With best wishes,

Sincerely yours,

DON BONKER,
Chairman, Subcommittee on Human Rights and International Organizations.

APPENDIX 12

RESPONSES OF MR. FUNKHOUSER TO QUESTIONS SUBMITTED IN WRITING BY SUBCOMMITTEE CHAIRMAN BONKER

What is the scientific basis for EPA's objections to the OECD "global issues" report of November 1981?

In the November 1981 draft of the OECD "Report on the Director's Workshop on Selected Global Environment and Resource Issues," the chapters on CO_2 and Climatic Change, the ozone layer, chemicals and acid precipitation were of principal concern to EPA. The basic USG criticism about these chapters was that they are scientifically superficial, technically inaccurate or incomplete, and did not provide a balanced description of what is known from laboratory tests and models versus empirical data from actual monitoring of the environment. As a specific example of the Report's shortcomings, reference was made to the U.S. detailed corrections to the acid precipitation section (attached).[1]

In addition, footnotes and attributions were lacking, the Report's "experts" were not identified and the Report itself was never reviewed by a qualified and objective body of scientists, let alone studied and discussed in substance by the member states.

What are the reasons for the Office of Federal Activities' Director serving as EPA's principal representative on the Global Issues Work Group?

The Director of the Office of Federal Activities directs the overall planning and development of national policy for dealing with environmental impact and analysis. Because of the international nature of the Global Issues Work Group, EPA representation is shared with the Agency's Director of the Office of International Activities.

Would you support the establishment in the U.S. of a clearinghouse to minimize the conflicts between U.S. commercial interests and our global environmental interests for such issues as hazardous substances?

EPA of course favors minimization of conflicts between U.S. commercial interests and our global environmental interest, but believes that adequate instrumentalities to accomplish this purpose already exist. Not only do EPA, State and CEQ and other government agencies dealing with the global environment maintain contact with U.S. commercial interests, but also the U.S. participates in the activities of international organizations such as UNEP, OECD and WHO which are addressing both commercial and environmental issues. The establishing of another organization appears to be unnecessarily duplicative.

Would you list some specific examples of ways in which private enterprise and free market forces will attempt to decrease the risk posed to developing countries by the export of hazardous substances?

Many U.S. chemical companies are voluntarily participating in the chemicals programs of international organizations such as the OECD and World Health Organization. The objectives of these programs are to reduce chemical risks to health and environment while not adversely affecting international trade in chemicals. Developing and industrialized nations alike will benefit from the harmonization of chemical control approaches through these programs, including standardization of laboratory practices and testing procedures.

The U.S. chemical industry, through the OECD Business and Industry Advisory Committee (BIAC), recognizes its responsibility to take all reasonable actions to ensure that use of its products in all importing countries is safe. In doing so, chemical manufacturers will take reasonable steps to evaluate products regarding hazards to human health and the environment, and that information acquired by chemical manufacturers concerning specific products will be communicated to all users. BIAC has renewed its offer to collaborate jointly with governments in establishing training programs to help developing countries safely use various chemicals.

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[1] See p. 475.

As the demand for chemicals in the developing countries grows, several U.S. chemical companies are individually taking steps to increase the amount of information provided to the importing country, to improve the clarity of the labels and increase technical training on the use of the chemical through plant or field visits. In 1981, one company held 600 meetings throughout Latin America for farmers, technical agricultural advisors and students of agricultural science. Many companies have representatives who accompany the delivery of the product to instruct in-country officials on the special handling required in using the chemical.

We understand that at some point U.S. chemical companies will propose the development of standard international hazard symbols for labels which will provide a greater degree of safety in using chemical products. The development of these symbols will probably take place under the auspices of either the OECD or UNEP.

Is EPA acquiring any of the areas of which CEQ is divesting itself, and, if so, how does EPA intend to address them?

Under the present Administration, CEQ has narrowed its focus and has identified three major areas for its work: acid precipitation, global environmental issues and NEPA. It is EPA's understanding that at this time the Council has no plans to divest itself of any of its present tasks and that future CEQ Inter-Agency activities with regard to Global Issues will continue through the Global Issues Work Group.

If for any reason changes should occur at CEQ in the future, EPA will work closely with the Council, the State Department and other appropriate agencies to ensure that all international environmental issues receive adequate attention.

Did the U.S. use the opportunity provided by the OECD DAC (development assistance committee) meeting the week of April 19 to coordinate positions for the UNEP session of special character?

Although there was a discussion item about UNEP on the DAC agenda, because of several priority subjects and limited time, there was no detailed discussion led by any nation on preparation for the SOSC. The Federal Republic of Germany did propose that UNEP assume the role of a clearinghouse between donor nations and the developing nations that belong to UNEP. However, a discussion of this matter was inconclusive.

The U.S. played a key role in placing the SOSC issue on the agenda of the April 20-21, 1982 OECD Environment Committee meeting and in leading the discussion.

What is EPA's process for assuring that the views of industry, labor and citizens groups are taken into account in formulating EPA's positions on international chemical issues; specifically, what role do environmental and citizen groups play in this regard?

Concerning chemicals in general, EPA works closely with industry and environmental groups. For example, industry, through the U.S. Business and Industry Advisory Council to the OECD, sends representatives to OECD expert group meetings where they have input on technical questions. In addition to expert groups, industry and environmental groups are regularly invited to and do participate in meetings which precede those of the OECD Chemicals Group and Management Committee.

As part of its policy, EPA will continue to make every effort to receive and consider the views of industrial and environmental organizations in its work on international chemical issues.

As part of its work on chlorofluorocarbons and their effects on the depletion of the ozone layer, EPA has consulted closely with industry and environmental groups in reviewing and developing comments on reports issued by the OECD and UNEP. This has been particularly true in preparing for work under UNEP's framework convention to protect stratospheric ozone.

EPA is working with the office of the U.S. Trade Representative to initiate multilateral negotiations to protect the property value of data submitted pursuant to pesticide regulations. These negotiations are intended to protect U.S. industry's proprietary rights to data which it develops, to facilitate international trade in agrochemicals, and to protect public health and the environment. Industry representatives are involved even at the present preliminary stages of discussion and fact finding. As a result of this close cooperation, we expect that the final agreement will be acceptable to all involved parties.

What is EPA's role in formulating policy in the areas of hazardous chemicals, and how will EPA assure that U.S. leadership is not abandoned in this area?

EPA formulates policies in the areas of hazardous chemicals as part of its administration of FIFRA and TSCA which govern the regulation of pesticides and toxic substances. On the international level, the Agency works in close consultation with the State Department on hazardous chemical issues, providing both policy and technical guidance for meetings of various international organizations such as the OECD, UNEP, WHO and FAO. This is done through the preparation of reports as requested and the review of documents for technical accuracy and domestic policy implications, both of which reflect EPA's expertise in the hazardous chemicals area.

The U.S. continues to occupy a leadership role in the domestic management of hazardous chemicals, including export policies and notification, and through it has gained valuable experience in dealing with the issues. Because of this expertise, other countries will continue to look to the U.S. for leadership in the hazardous chemicals area. EPA will work to ensure that the U.S. maintains an active role through information exchanges and by providing assistance to governments to establish programs similar to those carried out domestically.

What was EPA's recommendation on the OECD expert group report that favored notices for banned chemicals, and what was the U.S. Government's position?

The U.S. reviewed documents prepared by the Secretariat for the Experts Group on Information Exchange of Hazardous Chemicals. EPA's work on these documents was primarily of a technical nature done in consultation with industrial and environmental groups. The State and Commerce Departments took the lead on the policy portions of those documents dealing with export notifications, since those Departments are charged by the President to review and propose revisions, if necessary, of existing regulations or statutory authorities.

The U.S. position for the last meeting of the expert group supported the concept that the main purpose of export notifications (already required under U.S. law) is to provide information to the importing country on regulatory actions, not to control exports or stop shipments. The U.S. stressed that due to the policy review currently being conducted by State and Commerce, the U.S. was not in a position to endorse or reject at that time specific approaches to export notification as might be set forth in the report of the meeting of the Expert Group on Information Exchange of Hazardous Chemicals.

Why was the EPA representative to this OECD expert group meeting, who had attended two earlier meetings of the group, replaced at the last minute by a representative of the Commerce Department, and what was EPA's recommendation on changing our representative?

In light of a) the Presidential directive regarding essential travel and resultant State Department restrictions on the size of the delegation; and b) the President's directive to the State and Commerce Departments to review the policies and procedures concerning the export of hazardous chemicals, EPA recommended that a representative of Commerce would more accurately reflect current U.S. thinking on the issue.

APPENDIX 13

TIMETABLE OF ACTIVITIES REGARDING ACID DEPOSITION WHICH INVOLVE THE ENVIRONMENTAL PROTECTION AGENCY, SUBMITTED BY MR. FUNKHOUSER

Dates	U.S. side meeting	Bilateral meetings	EPA participants [1]
1.—UNITED STATES-CANADA MOI ON TRANSBOUNDARY AIR POLLUTION—1982 TIMETABLE			
Feb. 2, 1982	Coordinating Committee, U.S. side, State Department.		Kathleen Bennett, Richard Funkhouser, and Larry Regens.
February 1982		Work group 2, Washington (EPA).	Ken Demerjian.
Feb. 8, 1982		Work group 3, Washington (BWI).	Kurt Riegel.
Feb. 9 to 12, 1982		Work group 1, Toronto	Norman Glass.
Feb. 16 to 19, 1982		Work group 2 (subgroups only), Washington.	Ken Demerjian.
Feb. 23, 1982	Coordinating committee, U.S. side, State Department.		Kathleen Bennett, Richard Funkhouser, and Larry Regens.
Feb. 24, 1982		United States-Canada negotiating session [2] Washington (State).	Kathleen Bennett, Richard Funkhouser, and Larry Regens.
Mar. 8 to 12, 1982		Work group 2,Toronto	Ken Demerjian.
Mar. 22 to 23, 1982		Work group 1, Washington	Norman Glass.
Mar. 23 to 24, 1982		Work group 3B, Ottawa	Kurt Riegel.
Mar. 25, 1982		Work group 4, Ottawa	Lydia Wegman.
Mar. 31, 1982		Work group phase 3 reports due to coordinating committee.	
		Peer review of reports begins.	
Apr. 5, 1982	Coordinating committee, U.S. side, State Department.		
April 1982		Work group 4, Washington	Lydia Wegman.

Dates	Interagency meetings	International meetings	EPA participants
2.—INTERAGENCY TASK FORCE ON ACID PRECIPITATION INTERNATIONAL TASK GROUP—1982 TIME TABLE			
	Interagency task group, State Department.		Richard Funkhouser, Larry Regens, Dolores Gregory, and Dave Bennett.
June 8 to 10, 1982	Interagency task force workshop.		
Dates unknown		United States-Canada consultations on national acid precipitation research programs.	Larry Regens and Dave Bennett.
Dates unknown		United States-Swedish/Norwegian consultations on research programs related to specific acid precipitation problems.	Dave Bennett.

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[1] EPA Chairmen/Vice Chairmen listed. Other EPA participants in United States-Canada work groups on attached lists.

[2] Bilateral negotiations to continue with 3 to 4 more meetings—summer, fall, winter to be scheduled.

Dates	International meetings and projects	EPA participants
	3.—ECE CONVENTION ON LONG RANGE TRANSBOUNDARY AIR POLLUTION—1982 AND 1983 TIMETABLE	
Mar. 8 to 10, 1982	Experts meeting on effects of sulfur compounds on materials.	John Spence.
April 1982	Countries to send to the ECE information on effects of sulfur compounds on terrestial eco-systems and aquatic environments.	
	Also, to send information on control technologies	
	WHO and WMO to supply data on health and visibility effects.	
May 4 to 7, 1982	Experts meeting on aquatic and terrestial effects of sulfur compounds.	Ray Wilhour.
May 12 to 14, 1982	Experts meeting on cost effectiveness of desulfurization techniques.	Marty Wagner.
June 30, 1982	Countries to submit reports on new strategies and policies for control of sulfur compounds to ECE Secretriat.	
Summer 1982	ECE Secretariat to prepare reports using above information	
Aug. 30 to Sept. 3, 1982	12th session of working party on air pollution (concerned with cost effectiveness of desulfurization techniques), Geneva.	
Sept. 6 to 10, 1982	2d session of working party on effects of sulfur compounds on the environment (to review above report on effects), Geneva.	
Dec. 6 to 12, 1982	Meeting on costs and benefits associated with a number of scenarios for SO_x control (to prepare an outline of cost-benefit analysis for next meeting of Interim Executive Body), Geneva.	
Feb. 7 to 11, 1983	3d Session of Convention Executive Body, Geneva	
Feb. 14 to 18, 1983	ECE/Senior Advisers on Environmental Problems (SAEP), Geneva.	
	4.—OECD ACTIVITIES RELATED TO ACID DEPOSITION—1982 TIMETABLE	
Apr. 20 to 22, 1982	Environment Committee Meeting, Paris (Agenda will include 1983 project proposed on SO_x, NO_x, and acid precipitation).	Joe Cannon.
June 1982	Extended Bureau of Energy and Environment Group, Paris	Larry Regens.
May 24 to 28, 1982	OECD Symposium on Economic Aspects of Coal Pollution Abatement Technologies, Netherlands.	Larry Regens, Kurt Riegel, and Robert Brenner.
Sept. 30 to Oct. 1, 1982	Energy and Environment Group, Paris	Larry Regens.
Nov. 17 to 19, 1982	Air Management Policy Group, Paris	Gary Foley.
Late 1982	OECD workshop on long-range transboundary models	Gary Foley.
	5.—UNITED NATIONS ENVIRONMENT PROGRAM (UNEP)—1982 TIMETABLE	
May 10 to 18, 1982	UNEP Governing Council—special session	
May 19 to June 2, 1982	UNEP Governing Council—regular session, Nairobi	
	6.—WORLD HEALTH ORGANIZATION (WHO) ACTIVITIES RELATED TO ACID DEPOSITION—1982 TIMETABLE	
Ongoing work	EPA/EMSL/RTP is continuing to collect, process, and summarize SO_x and NO_x data that collected worldwide under UNEP/WHO/GEMS urban air monitoring program.	Gerald Akland, EMSL/RTP.
	7.—WORLD METEOROLOGICAL ORGANIZATION (WMO) ACTIVITIES RELATED TO ACID DEPOSITION—1982 TIMETABLE.	
Ongoing work	EPA/EMSL/RTP is continuing to collect, process, and summarize SO_x and NO_x data that is collected worldwide under UNEP/WMO/GEMS for selected atmospheric constituents program.	Peter Finkelstein, EMSL/RTP.
	8.—NATO/CCMS ACTIVITIES RELATED TO ACID DEPOSITION—1982 TIMETABLE	
Apr. 26 to 29, 1982	Conservation and Restoration of Monuments Pilot Study Meeting, England.	
May 11, 1982	CCMS Spring Plenary—NATO HQ, Brussels, Belgium	
May 17 to 21, 1982	Air Pollution Control Strategies and Impact Modeling Pilot Study: Working Group and Panel 1 on "Heavy Metals Emission." Panel 3 on "Environmental Impact".	Michael Berry and Michael Osborne.
	Followup to Pilot Study on Air Pollution Assessment Methodology and Modelling: 1982 Workshop on "Ambient Air Quality and Deposition".	

Dates	International meetings and projects	EPA participants
	Week of meetings concludes with ad hoc group on the "Total Air Pollution Cycle".	
	Above meetings—Oslo, Norway	
Spring 1982	Man's Impact on the Stratosphere Pilot Study: Flight Testing of Tunable Laser Diode spectrometer (TLDS) to measure atmospheric nitric oxide and nitrogen dioxide. Balloon flight from Palestine, Tex.	
June 6 to 10, 1982	Followup to Pilot Study on Flue Gas Desulfurization Third Followup Meeting, Ottawa/Toronto, Ontario, Canada.	Frank Princiotta.
August 1982	13th International Technical Meeting (ITM) on "Air Pollution Modeling and Its Application," Cannes, France.	Ken Demerjian.
Dates unknown		
	9.—INTERNATIONAL CONFERENCES RELATED TO ACID DEPOSITION—1982 AND 1983 TIMETABLE	
Mar. 17 to 18, 1982	APCA Government Affairs Seminars, session 3: Acid Rain: International Perspectives (Mar. 18, 1982), Washington.	Richard Funkhouser.
May 24 to 28, 1982	International Symposium on NO^x, Maastricht, Netherlands	
	Swedish Conference on Acidification of the Environment (to commemorate the 10th anniversary of the U.N. conference on the Human Environment). It will consist of the following two sessions: Stockholm	
June 21 to 25, 1982	Parallel expert meetings on (a) Effects of acid deposition on aquatic and terrestrial ecosystems and (b) cost and optimal application of techniques reduce emission of sulfur and nitrogen oxides from coal and oil combustion.	
June 28 to 30, 1982	Conference at a high political level to which ECE Convention signatories will be invited.	
Nov. 7 to 10, 1982	APCA Specialty Conference on Atmospheric Deposition, Detroit.	
May 16 to 20, 1983	IUAPPA 6th World Conference on Air Quality, Paris	
	10.—UC INTERNATIONAL AIR POLLUTION BOARD—1982 TIMETABLE	
Mar. 31, 1982	UC semiannual meeting includes session on activities of the International Air Pollution Board, Washington.	Don Walters.

APPENDIX 14

Letter and Report From Alvin Trivelpiece, Director, Office of Energy Research, Department of Energy, to Mr. Funkhouser Regarding Acid Precipitation

Department of Energy,
Washington, D.C., February 3, 1982.

Ambassador Richard Funkhouser,
Office of International Activities, Environmental Protection Agency, Washington, D.C.

Dear Ambassador Funkhouser: As you requested, I have had my staff review the sections "CO_2 and Climatic Change" and "Acid Precipitation" of the OECD report. Enclosed are our comments.

The "Acid Precipitation" section caused particular concern. In our opinion, this issue is far too complex and, as yet, too little understood to be reduced to the rather sweeping generalizations portrayed in the paper. In the first part of Working Paper No. 2.3, "Acid Precipitation," a detailed interlineated markup of the paper is given in an attempt to correct the most obvious deficiencies. Following this, we give a detailed paragraph-by-paragraph commentary.

As for Section 2.1 on "CO_2 and Climatic Change," our review contains some new material which, for convenience, is so marked in the margin.

I hope that this review proves useful.

Sincerely,

Alvin W. Trivelpiece,
Director, Office of Energy Research.

Enclosures.

Acid Precipitation

REPORT ON THE DIRECTOR'S WORKSHOP ON SELECTED GLOBAL ENVIRONMENT AND RESOURCE ISSUES HELD AT OECD, PARIS, OCTOBER 27 AND 28, 1981

A. The issue

1. Sulphur and nitrogen oxides and other acid precursors emitted by anthropogenic and natural sources throughout the world can travel long distances in the atmosphere, undergoing chemical transformations, and return to earth, inter alia, as acid precipitation. In sensitive watersheds, this can increase the acidity of water bodies and has the potential impact on other ecosystems. As a national and international issue, any satisfactory solution requires increased knowledge, uses and effects and a shared perception of the nature and extent of actual and future damage caused by acid precipitation and of the costs and benefits of counter-measures, so that appropriate strategies can be developed.

B. Background

2. Acid rain has been linked, inter alia, to emissions of sulphur and nitrogen oxides produced mostly by fossil fuel combustion in power plants, by smelting industries and from motor vehicle exhausts. Converted by chemical reactions in the atmosphere to sulphates and nitrates, they return to the earth in rain, snow, or through dry deposition. The effects of such emissions could be felt not only in the neighbourhood of the sources, but also at distances of hundreds of kilometres, ending on circumstances of release, technological conditions, the presence of oxidants, precipitation and other atmospheric phenomena. "Acid rain" has been observed globally. Some of it is thought to result from pollutants which have travelled distances of over 500 km.

3. It is now generally accepted that acid deposition can cause impairment of aquatic ecosystems in sensitive areas (decrease in fish population of acidified lakes) and its potential effects on yield of forests and crops, human health, and materials

are under study. Evidence of the nature and extent of such damage, as well as anomalous situations in which no damage has been observed, are under evaluation. Attempts are being made to observe these effects both in countries which are major emitters of the gases, as well as in distant countries which could be receptors of the pollution as a result of prevailing wind patterns. Serious concern is being expressed in Scandinavia and Canada where damage from acid rain is thought to result from emissions in other countries.[1]

4. In some OECD countries, projections of future emissions of SO_x and NO_x indicate a possible growth, notably if coal substitution for oil is carried out without environmental controls.

C. Significance for OECD member countries

5. The problem of acid rain may arise particularly in those regions where SO_x and NO_x are produced on a large scale. OECD Member countries, because of their high industrial development over limited geographical areas, are mainly at the origin of the anthropogenic source of the phenomenon. In Europe, however, Eastern European countries may also contribute significantly to acid rain precursors.

6. Since industrialised countries, most of them members of the OECD, are the main producers of SO_x and NO_x and are aware of the damage that can be caused by such emissions, work on acid rain has been concentrated in such countries, with international cooperation being channelled through the OECD and other organizations. In May 1980, the United States and Canada signed a Memorandum of Intent, calling for an investigation of the problem.

D. Relevant work under way or planned within OECD member countries

The U.S.-Canada Memorandum of Intent could be referenced here.

(Delegates are asked to contribute relevant information in writing before and during the Environment Committee's 30th Session on December 15th–17th. An annex will be prepared based on the information obtained.)

E. Relevant work under way or planned by international organizations

This work should focus on technical exchanges, standardization of measurements, etc., and avoid consideration of global strategies.

(See Annex No. 1 on "Relevant Work Underway or Planned by International Organisations". If necessary, this will be revised further following the 30th Session.)

Constraints and opportunities for action

7. While the consequences of acid precipitation are not well established, the mechanisms underlying the chemistry of acid rain formation are even more complex. Neither is it clear how cost effective the available counter-measures would be in avoiding or reducing damage in receptor areas. The transformation from oxides to acidic components is less well known with regard to NO_x than it is for SO_x and much has yet to be understood regarding transport and deposition phenomena before the benefits of pollution control strategies can be evaluated.

8. Given the problems inherent in the methodologies, models and measures concerned, the facts may not be established to a degree of credibility sufficient to determine corrective measures. Another constraint may stem from the fact that the population in the source jurisdiction may have different priorities than at long distance in the affected jurisdiction and may place quite different values both on the costs of damage and on the costs of various control strategies available or which may become available.

9. This odious inference and attack on motives must be deleted.

10. Some policy options which might find use in controlling the problem include the following:

(i) For energy production and consumption:

More efficient use of energy;

Increased use of non-fossil fuels, low-sulphur fuels, and less polluting energy sources:

Installation of technologies to reduce sulphur and nitrogen emissions.

(ii) For smelting and transportation industries:

R and D on new technologies to reduce emissions from the various sources of SO_x and NO_x; and other precursors;

(iii) For receptor areas:

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[1] See the recent "state-of-knowledge" report on this issue prepared by an international team of scientists: "Atmosphere-Biosphere Interactions: Toward a Better Understanding of the Ecological Consequences of Fossil Fuel Combustion." National Academy Press, 2101 Constitution Avenue, Washington, D.C., 1981.

Protection of sensitive areas, e.g., through liming
R and D on new process technologies.

G. Possible action by the OECD

11. Given the present political importance of this topic in a number of OECD countries, the Environment Committee may now wish to consider the advisability of undertaking further work and fostering the exchange of technical information to obtain a better scientific understanding of the problem.

12. The OECD should not duplicate work being carried out in other international bodies, in particular the ECE in its follow-up to the Convention on Long Range Transboundary Air Pollution. But these are areas where the special economic skills of the OECD might be useful:

In further examining the state of the art with respect to understanding the effects of acid precipitation, and the economic and amenity implications, of damage avoidance;

In determining the contribution of NO_x emissions to acid precipitation, a substantial amount of research has been devoted to sulphur emissions and the extent to which they are a cause of acid precipitation but less research has been devoted to the role played by nitrogen oxides.

In examining various emission control or remedial strategies and their associated costs.[2]

COMMENTS ON OECD PAPER ON ACID RAIN

SPECIFIC CRITICISMS

Paragraph A.1

Fails to recognize that aquatic impacts are found only in geologically sensitive areas, and incorrectly leads the reader to believe that aquatic impacts are pervasive.

Asserts in the absence of supporting field evidence that the acidity of soil is increased and that damage occurs to crops and forests; laboratory experiments suggest a potential for damage exists.

Paragraph B.2

Fails to recognize that sulfur and nitrogen oxides also originate from natural sources; places emphasis only on anthropogenic sources; and does not attempt to rank their relative importance for any geographical area.

Can easily mislead the reader to conclude that all sulfur and nitrogen oxides return to earth as acid rain when in fact much of these materials are deposited in other forms.

Fails to recognize that most damages are postulated except for increased acidity and decreased fish population in some lakes in geologically sensitive areas.

Omits the important fact that nitrates and sulphates are also deposited in dry form.

Omits the observation that acid rain occurs in remote regions of the earth as, for example, in the western extremities of Hawaii.

Paragraph B.3

Fails to note that concerns about nonaquatic impacts stem from laboratory experiments using high deposition rates or other conditions not generally found in nature.

Asserts without basis that a significant amount of damage occurs in Canada when in fact damages have not been reliably quantified either in the referenced document or elsewhere.

Asserts without basis that damages in Canada stem from emissions in other countries when in fact the connection to foreign emissions has not been established quantitatively, and at least a portion of the observed aquatic effects are due to local sources.

Paragraph B.4

Fails to recognize that future emissions of some pollutants have been decreasing and are expected to continue to be lower through the year 2000 (e.g., SO_x in the U.S.).

Fails to note the potential interaction between SO_x and NO_x emissions which, some scientists theorize, would cause acid deposition to remain constant despite a reduction (or increase) of SO_x emissions alone.

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[2] Work under way in the Group on Energy and Environment concerning the costs of coal pollution abatement is relevant to this.

Paragraphs B.2 to B.4

Fails to identify the many unknowns and uncertainties arising from a lack of basic understanding of transport, chemical transformations, cloud physics and deposition impacts—all arising from a profound need for extensive R&D.

Paragraph C.5

Also fails to recognize that acid rain is found in remote geographical regions.

Paragraph C.6

Fails to explicitly state what international coordination is being channeled through OECD.

Paragraph F.7

Incorrectly asserts that the consequences of acid precipitation are well established.

Misleadingly implies that a constraint on action is the lack of precise estimates of cost effectiveness, when in fact the constraint is that science is as yet unable to determine what control technologies will be effective in reducing acid rain or the relationship of reductions in emissions to changes in acid precipitation. (Many experts believe the relationship to be highly nonlinear.)

Fails to recognize that a reliable quantification of damage does not exist so that neither costs nor benefits can be reliably estimated.

Paragraph F.8

Asserts that a constraint on action is lack of sufficient knowledge ". . . to satisfy all the parties concerned." The real constraint on any action, however, is the lack of scientific consensus on the nature of damage, the amount of damage attributable to acid precipitation, the mechanism of converting emissions to acids, the relationship between sources and receptors, and the effectiveness of any control strategy.

Paragraph F.9

Fails to recognize that the benefits of control technologies have yet to be quantified, making comparisons questionable.

Oversimplifies the position of those who ". . . seek to avoid investment in countermeasures . . ." by not acknowledging those who are unprepared to act now because scientific uncertainties do not permit a rational course of action to be selected.

Paragraph F.10

Omits the most important option of increasing R&D on impacts and atmospheric processes.

Omits option of taking measures to protect sensitive areas selectively.

Makes overgeneralizations about the ability of modified coal-fired power stations to remain economically competitive after investing in the ". . . best, commercially available technologies to reduce sulfur and nitrogen emissions. . . ."

Paragraph G.11

Inappropriately suggests that OECD should assume a position of ". . . developing appropriate policy guidelines for OECD Member governments. . . ."

Paragraph G.12

Omits possible OECD R&D programs which could decrease scientific uncertainties.

APPENDIX 15

Excerpts From a Draft Reply to Paris on OECD "Globaloney," Jan. 26, 1982, From Mr. Funkhouser to Anne Gorsuch, Administrator, Environmental Protection Agency

[Telegram]

To: AMEMB Paris.
Info: All OBCD captials.
Captions: Please pass Ambassador Katz, OECD.
Subject: OECD Secretariat workshop report on global issues.
Reference: Paris 02603.

1. We appreciate extension of deadline until Feb 9 for USG comments on Report and also the generous remarks re the "US contribution".

2. Our problem in meeting deadline with appropriate response is complicated by the following outstanding questions which concern the circumstances underlying the Secretariat effort:

(a) Is it in the interest of the OECD and its member states for the Secretariat to rush into print independently on a subject which is so scientifically controversial, technically complex and substantively divisive? If so, why?

(b) Under what authority is the OECD Secretariat empowered to so act, independently and publicly? If only by precedent, should not a change in precedent be considered by those concerned? Does the Report and its publication have the approval of the Secretary General?

(c) Does the Secretary General consider that the method whereby this Report was formulated and moved through the Environment Committee represents a genuine effort to obtain member states' understanding of the content and approval of its actions?

(d) Would not the Report have benefitted from peer review of content prior to the decision to publish it, e.g., by member states or at least by the official OECD instrumentalities, BIAC and TUAC?

(e) Would not the Report benefit from full discussion of content at the April meeting of the Environment Committee before publication?

(f) Would not the decision of the Secretariat to avoid open discussion of content suggest motivation, e.g., self-serving publicity, inappropriate to a subordinate international Secretariat whose raison d'etre is presumably to serve the interests of the member states?

(g) What are the scientific/technical qualifications of the authors?

(h) What is the cost of Report and its publication? What is the USG contribution thereto?

(i) What are the budgetary implications of the Report's recommendations re increased authority and control activities?

3. Whereas our detailed criticisms of the content of the Report will follow ASAP, we can contribute the following preliminary comment as an indication to the Secretariat and to member states of our basic concerns:

(a) the Report inadequately reflects the weight of scientific disagreement over key issues, e.g., ozone.

(b) the Report contains a plethora of technical inaccuracies and inadequacies, e.g., acid precipitation.

(c) the Report suggests expansion of the OECD role into areas already occupied by other international organizations, e.g., UNECE.

(d) the Report repeats the environmental cliches, generalities and superficialities of earlier "gloom and doom" publications which currently are under scientific challenge, e.g., "Global 2000".

(e) the Report implies that industrial progress and economic development lie in opposition to the global environment and the lessening of world poverty and hunger.

(f) the Report suggests that OECD should transform itself into an arbiter of policy and worldwide enforcement agency.

(g) the Report diminishes the role of science, human experience, initiative and imagination in finding solutions.

(h) the Report ignores the possibly constructive role of private enterprise, e.g., failure to allow BIAC to play any role in the development of the Report or appraisal of its content.

(i) the Report's approach to environmental protection is antithetical to certain basic USG environmental positions and policies, e.g., increased centralization of authority, increased regulatory action and controls before adequate scientific inquiry and justification, repudiation of private sector initiatives and resources, heavier reliance on theoretical than empirical data, evangelism before realism, opinion over fact, illegitimate extrapolation.

5. Suggested title for Report, if the Secretariat insists on publication despite the foregoing objections: "OECD Globaloney", to paraphrase Herman Kahn. Otherwise call it what it is: "Views of Global Issues: A Report by Experts Selected by the OECD Secretariat.

APPENDIX 16

Press Release From the Institute of Ecology Regarding Expanding Training on Natural Resource Productivity, Submitted by Mr. Malone

A national panel of renewable resource scientists has proposed major expansion of research and technical training on increasing the productivity of natural resources to meet growing needs in the U.S. and world markets. In a report released in early January by the Institute of Ecology, a national research consortium, and the Holcomb Research Institute of Butler University, Indianapolis, the panel calls for increasing research support on natural resource productivity and related environmental science at a rate of 7 percent annually (in constant dollars) during the decade of the 1980's. Areas identified for increased support include aspects of soils, nutrient cycling, pollutant effects, fisheries, forestry and rangeland productivity.

Citing recent success in using research to improve yields from previously degraded resources, the panel found strong evidence that increases in ecological and environmental research would bring a high return in continuing U.S. and global resource productivity and environmental quality. "The panel's major concern is with the urgency for federal support of resource-related research to be brought into balance with problem-solving needs," said Dr. Frank B. Golley of the University of Georgia, but added that benefits from increased training of the personnel to apply results in industry and state government are also important. The report recommends that the expanded program in environmental and resource research be undertaken jointly by major resource industries and the federal government.

Dr. John Cantlon, Michigan State University, Chairman of the panel emphasized that the main concern of the study was in the trend toward level-funding (in constant dollars) of basic and applied research in environmental and natural resource biology during the late 1970's. He noted that this trend has been followed in 1982 by significant budget reductions for resource-related studies along with many other areas. He also noted that while utilization or alteration of natural resources is increasing, and human expectations for goods from them is increasing, our capacity to mitigate a decline in productivity is decreasing. At the same time, he said, the projected increases in natural gas prices will make high applications of nitrogen fertilizers almost prohibitive, thus dislocating much of our existing management practice.

Dr. Thomas F. Malone, Director of the Holcomb Research Institute of Butler University, a co-sponsor of the study, cites the report as an opening salvo in the dialog taking place on national policies and priorities for federal research support. He noted that President Reagan's science advisor, George Keyworth, has already indicated a commitment to criteria in determining priorities for research, and they are excellence and relevance. The priorities described in the report meet these criteria fully, he said.

The report cites moderate levels of recovery in the Great Lakes for both recreation and fisheries, improved management of forests in the face of intensive harvesting, improved management of arid-region grazing lands, and the restoring of water quality and recreation in urbanized lakes as examples of economic enhancement linked to investment in research and technical training.

The report also identifies major natural resources for which present knowledge is inadequate. Nutrient depletion in crop, forests and grazing soils is already a serious problem in certain areas due to erosion, and acid rain appears to be producing similar effects, the report concludes. Open-ocean fisheries face an increasing range of stresses both from heavy fishing and environmental alterations, but little is known about the potential for recovery in open-ocean systems. Loss of species through extinction, and its relationship to sustained productivity of resources, is cited as another area for which few personnel are qualified technically.

If needs for food and fiber are to be met by the natural resources of each nation, the report concludes, and historic trading in raw materials with Third World countries is to be continued, a major strengthening is needed of the U.S. capability to enhance productivity. Dr. Malone added that a need exists also to project more adequately the coming increases in domestic and foreign needs for these resources. Thus, the report considers the fact that the political stability of Third World nations, as well as of the U.S., is closely linked to maintaining the productivity of renewable resources. "Developing and communicating ecological knowledge to the Third World," he concludes, "is the only way the cycle of severe resource depletion and resultant political/social deterioration can be broken."

APPENDIX 17

Outline of the Structure of the International Institute for Applied Systems Analysis Submitted by Mr. Malone

The International Institute for Applied Systems Analysis (IIASA) Laxenburg, Austria

ORIGIN

Established 4 October 1972 following five years of negotiations initiated by the United States Government during the Johnson Administration and concluded during the Nixon Administration with that Administration's strong support.

CHARACTER

A non-governmental research organization chartered in Austria and created to conduct studies of the problems of modern societies arising from scientific and technological development, using advanced analytical techniques.

OBJECTIVES

To advance international cooperation, advance science and systems analysis, and to apply its research findings to problems of international importance.

MEMBERSHIP

One "National Member Organization" (NMO) from each of seventeen countries in North America, Western and Eastern Europe, and Asia: Austria, Bulgaria, Canada, Czechoslovakia, Federal Republic of Germany, Finland, France, German Democratic Republic, Hungary, Italy, Japan, Netherlands, Poland, Sweden, United Kingdom, United States, and the U.S.S.R. The membership has increased from twelve to seventeen in nine years, and Mexico is actively considering membership. The National Academy of Sciences is the U.S. member and the Soviet Academy of Sciences is the Soviet member.

GOVERNING BODY

The IIASA Council, consisting of one representative from each National Member Organization, is chaired by Dr. Jermen Gvishiani of the Soviet Union. The Chairman of the Council's Finance Committee, and a member of its Finance Committee, is the U.S. Representative, Dr. N. Bruce Hannay, Foreign Secretary of the National Academy of Engineering and former Vice-President for Research & Patents of Bell Laboratories.

MANAGEMENT

The chief executive officer is the Director who is responsible for the formulation, management, and administration of all Institute activites. The first two Directors were Americans: Dr. Howard Raiffa and Dr. Roger Levien. The current Director, unanimously appointed for a three-year term beginning 1 December 1981, is Dr. C. S. (Buzz) Holling, Professor of Animal Resource Ecology at the University of British Columbia. He will be assisted by two Deputies, only one of whom has yet been appointed: Dr. Allen Hirsch, former Deputy Assistant Administrator for Environmental Processes and Effects Research of EPA, who was seconded to the Institute by the U.S. Government in December, 1981.

STAFF

About 100 scientists per year (including 80 supported by member dues and 20 supported by grants and contracts), augmented by an equal number of support staff.

Most work at IIASA for six months to three years. The work of the staff is augmented by a collaborative network of over 300 institutions, including 50 in the U.S. and 30 in the Soviet Union. IIASA's staff has included three Nobel Prize winners, (one from the U.S.S.R.), a U.S. National Medal of Science winner, a Soviet State Prize winner, and members of the National Academies of Science and Engineering in the U.S., the U.S.S.R. and other nations.

1982 RESEARCH PLAN

IIASA's 1982 Research Plan, unanimously approved by the Council, includes work on energy systems, food & agriculture, resources & environment, human settlements & services, management & technology, system & decision sciences, and regional development.

1982 BUDGET AND DUES

The 1982 IIASA dues budget is 152 million Austrian Schillings (about 10 million dollars). The National Academy of Sciences, and the Soviet Academy of Sciences each pay "Category A" dues in Schillings equal to 23.5% of the Institute's dues budget. The other fifteen "Category B" dues members each pay about 3.5% of the dues budget. Corporate contributions in the amount of about $250,000 annually are provided through the NAS.

PROPOSED 1983 BUDGET AND DUES CHANGES

In order to insure U.S. participation the IIASA Council has agreed to consider a revised dues structure, providing for a lower ratio of Category A to Category B dues, and a reduced budget equal to about 75 percent of the 1982 level. U.S. and Soviet dues would be approximately $1,000,000 each with the other members each paying roughly the same amount as in 1982, i.e. about $340,000.

NAS OVERSIGHT

The National Academy of Sciences provides oversight of the work of IIASA through an Advisory Committee consisting of experts from industry, government, academia, and U.S. research centers. This Committee, the National Research Council's Commission on International Relations, and the NAS Council have agreed that the Institute's work merits the Academy's continued membership. The 1983 cost of the Academy's advisory committee and staff would be $150,000. The U.S. funding requirement both for dues and oversight would thus total $1,150,000, one-half the 1982 cost.

NSF EVALUATION

The National Science Foundation conducted extensive evaluations of the Institute in 1978 and 1980. Having concluded that IIASA's work was of high quality, the evaluators unanimously recommended that the Foundation continue to fund NAS membership in the Institute.

IIASA ACCOMPLISHMENTS

In 1981 the Institute announced the publication of a report "Energy in a Finite World," on its 7-year study of the global energy program. The objective of this unique research, which involved over 140 scientists from 20 countries, was to provide new insights into the international and long-term dimensions of the energy problem over a fifty-year period beginning in 1980. This study, which incorporates Soviet data made available for the first time, has elicited strongly favorable comments from such eminent specialists as Dr. Alvin Weinberg, Dr. H.A. Bethe, and Dr. Harvey Brooks, as well as from Deputy U.S. Energy Secretary Kenneth Davis.

An IIASA scientific team, including U.S. members, has developed and published a novel approach to the design of environmental management policy, known as the "adaptive approach to environmental management." This approach has been employed by both the U.S. Fish & Wildlife Service and the EPA.

The U.S. Department of Agriculture and agricultural specialists from other countries (including the Soviet Union) are collaborating with IIASA in the development of sets of linked national agricultural models, covering 85 percent of the world's population. The purpose of this program, which includes data from the East-bloc (CMEA) countries, will be to help define alternative policies to alleviate world food problems.

IIASA has conducted path-breaking research in the field of non-differentiable optimization, a mathematical technique of value in studying such topics as health care delivery and the international market for agricultural products. To conduct this research, IIASA has brought together leading experts from the U.S., the U.S.S.R. and elsewhere.

IIASA has conducted a comparative study of migration and settlement in all 17 member countries, including new data from the U.S.S.R. and other East-bloc nations.

IIASA has conducted important work on market penetration. A Czech scholar at the Institute has produced a report on this subject which, in the opinion of an NSF evaluator "represents the first real innovation in many years in the theory of technological change."

ADVANTAGES OF U.S. MEMBERSHIP

Opportunities for U.S. scientists to actively collaborate over an extended period with foreign colleagues in a non-political environment.

Availability to the U.S. scientific and policy communites of Soviet and East-bloc data, not obtainable elsewhere, on energy, food, migration, etc.

APPENDIX 18

[From the New York Times, Mar. 29, 1982]

STUDY CITES PERIL IN WORLD AGRICULTURAL DECLINE [1]

(By Philip Shabecoff)

WASHINGTON, MARCH 28.—Deteriorating biological systems around the world pose a grave threat to the global economy, according to a new report issued by the Worldwatch Institute.

The report warns that excessive pressure on crop and grazing lands, forests and fisheries, combined with continued rapid population growth, portend inevitable declines in living standards in many nations and regions of the world.

It asserts that the decline already has started in the area south of the Sahara in Africa and may soon begin in the Andean region of South America. Even the major industrial nations will not be spared over the long run if these trends continue, it concluded.

"It is increasingly clear that the world is on the edge of an environmental crisis that is undermining the global economy," in the view of the institute, a private research organization concerned with international economic and environmental problems.

INTERNATIONAL EFFORT SOUGHT

The report, issued on Friday and entitled "Six Steps to a Sustainable Society," calls for international efforts to address environmentally based economic problems that, it says, are beginning to afflict many countries without regard to their political or economic systems.

The report was written by Lester R. Brown and Pamela Shaw and is based on Mr. Brown's recently published book, "Building a Sustainable Society."

At a news conference held to introduce the report, Mr. Brown commented: "If we want to know what economic indicators will be like 10 years from now, we should look at the ecological indicators of today. If we want to know, for example, what will be happening to food prices by the end of the century, we should look to soil erosion today."

In 1934, the report points out, the per capita world production of wood peaked and has been declining since. In the 1970's per capita world production of fish, beef, grain and oil also peaked and declined, all after a long period of uninterrupted growth.

These trends are unlikely to be reversed without a concerted effort because they are caused by severe environmental degradation and excessive exploitation, the report contends. Wood production is declining because of deforestation, it says. Food production is down because of soil erosion and the spread of deserts. Cattle lands have been overgrazed and oceans and lakes overfished.

Meanwhile, continued rapid population growth is inexorably increasing demand for the products of the earth's biological system, the report says. Projections, such as one by the United Nations, that the world population will stabilize at around 10 billion, compared to today's 4 billion, are based on assumptions of economic development by countries where the growth rate is highest. But the very fact of rapid population growth combined with the deteriorating biological systems will lead to economic decline rather than growth and continued high birth rates, the report argues.

These trends are so new, Mr. Brown said, that policy makers in most governments are not fully aware of them and their implications.

The report lists six steps that must be taken if economic decline is to be averted and sustainable growth achieved worldwide:

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Population must be stabilized gradually so that it levels of at the 6 billion mark around the year 2020.

Soil erosion and other soil losses must be reversed.

A large scale, sustained global reforestation program must be undertaken.

Industrial nations and poorer countries must move toward a systematic recycling of materials.

Energy must be conserved through creation of a more energy-efficient economic system.

Renewable sources of energy must be developed.

"Efforts to put society on a sustainable footing will tax the capacity of individuals and institutions everywhere to change and adapt to the new circumstances," the report says. "Some forward-looking countries with effective leadership will adjust in time to avoid severe economic and social stresses. Others will learn the hard way."

APPENDIX 19

[From World Environment Report, Mar. 15, 1982]

Oil-dumping Tankers Can Now Be Traced

(By Norman Myers)

Nairobi.—The Inter-governmental Maritime Consultative Organization believes it has a way to track down ships that dump their oily wastes at sea, leaving pollution in their wake.

Swedish researchers have come up with a simple and inexpensive technique, to add tiny though readily identifiable particles of a metal alloy to oil cargoes, thus "fingerprinting" them. Sweden's scientists have just completed a half-year trial in the Baltic (which averages 500 oil slicks a year), in conjunction with West Germany, East Germany, Poland and the Soviet Union. The findings of this pioneer experiment appear to be positive.

A parallel technique is being formulated by the General Electric Research and Development Center, of Schenectady, New York. The main difference is that the tell-tale addition to oil cargoes would be made up of magnetic metal particles, which can be easily removed by magnetic filters when the oil cargo is unloaded.

A sophisticated approach is being engineered by Lancaster University in Great Britain. Scientists at the university are devising a system that will enable a satellite to speedily inform ground-based scanners of an oil slick while it is still in the making, thus allowing an offending tanker to be caught virtually in the act.

In practice there may be little need to deploy these sleuthing strategies. When a tanker captain knows that his company will be hit with a clean-up bill, he will probably utilise the relatively cheap methods already available to store "clean-out oil washes" on board. But until tanker captains know they can be traced, wastes will still be dumped at sea.

APPENDIX 20

[From the Washington Post, Mar. 27, 1982]

Ocean Burial Weighed for Old Nuclear Subs [1]

(By George C. Wilson)

The Navy is considering sinking its old radioactive submarines in the depths of the ocean, fresh evidence that the arms race is compounding the gigantic problem of disposing of nuclear wastes.

The Navy has five old nuclear-powered submarines waiting for burial, either in the ocean or on land. More subs will soon be lined up behind them.

"With over 100 nuclear-powered submarines in operation, the Navy is faced with eventual decommissioning of these ships at a future rate of possibly three or four per year over the next 30 years, and a permanent means of disposal must be developed that is environmentally acceptable," the Navy said in a statement signaling its intention to start assessing burial sites.

Today's nuclear attack submarines cost $850 million each, while the giant Trident missile sub has a price tag of about $1.3 billion.

One option for disposing of wornout submarines is to take the nuclear fuel out and then dump the ships in deep parts of the Atlantic or Pacific. The other is to cut out the radioactive section housing the power plan and sent them to the Enery Department's burial grounds in Savannah, Ga., and Hanford, Washington.

A Navy spokesman said yesterday that his service is taking the first step for toward finding a final resting place for nuclear submarines: preparing an environmental impact statement, a process expected to take about 18 months.

Although the Navy defangs its retired nuclear submarines by taking out the nuclear fuel, the metal in the power plant that surrounded it says radioactive for years, with cobalt 60 the main source of radiation. However, the Navy stressed in its formal notice—printed Jan. 14 in the Federal Register—that it would take great pains to protect the environment and did not believe radioactivity from the subs would turn out to be a high risk.

Stressing that it has not decided which way to go, the Navy said sinking the submarines in deep water would be cheaper than land disposal. "If the sea disposal were to be selected, the submarine reactor plant would be defueled and all the nuclear fuel would be removed from the ship," the Navy said. "Hull integrity would be restored and the ship prepared for towing and for flood in such a matter that it would land on the ocean bottom intact with reactor plant containment maintained."

The Navy conceded that the radioactive metal in the reactor would rust out eventually, no matter whether the subs were buried in the ocean or on land, but it estimated that the release of radiation would be safe, "negligible" levels by then. The study under way is designed to assess the risks.

If the Navy opts for sea disposal, the Environmental Protection Agency would have to grant a permit for a specific part of the ocean—a process that could take up to three years, including time for possible consultations with foreign governments as required by the London Dumping Convention. Land disposal would be quicker, with the administrative work taking between one and two years.

The Navy has been investigating as potential dumping grounds an area of the Atlantic 17,000 feet deep, 200 miles southeast of Cape Hatteras, N.C., and a spot in the Pacific about 14,000 feet deep around 150 miles southwest of Cape Mendocino, Calif.

Two U.S. nuclear submarines lie at the bottom of the Atlantic—the Thresher, lost in 1963, and the Scorpion, which sank in 1968. No one survived either sinking. There is also the likelihood that some Soviet nuclear-powered submarines have sunk. The Soviet Golf-class submarine that the Glomar Explorer tried to raise off Hawaii in 1974 was diesel-powered but carried nuclear missiles. It sank in 1968.

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The Navy said it has detected radioactivity from cobalt 60 in the sea bottom near the Thresher and the Scorpion but not in the surrounding water, marine life or debris.

The Navy in 1959 dumped part of the power plant of the submarine Seawolf in 9,000 feet of water 120 miles off the Atlantic coast. "No significant effect on the marine environment is expected," the Navy said.

Concern about the health risks of burying radioactive material at sea or on land is sure to mount once the Navy tries to win public acceptance of a specific plan. Now awaiting decisions on their final resting places are the attack submarines Nautilus, expected to stay on land as a monument, Triton and Halibut and the missile subs Theodore Roosevelt and Abraham Lincoln.

APPENDIX 21

[From the New York Times editorial, Mar 22, 1982]

A DEPLETION OF SPECIES [1]

One of the world's 5 million to 10 million species becomes extinct each day. By the end of the decade the extinction rate will approach one an hour. A million species may have vanished by the year 2000. The loss of diversity will make the world a poorer place. But the United States, a necessary leader in any effort to halt the decline, is faltering in preserving even its own threatened species.

It is not just conservationists who worry about the disappearance of obscure species from distant plains or jungles. Cancer specialists know that two of their most important drugs come from a single denizen of tropical rain forests, the rosy periwinkle. Seed growers, who have to develop new strains of wheat every five years or so as the old ones become susceptible to disease, understand the importance of preserving the diversity of gene pools. But the ancestral gene pools for most staple American crops lie abroad. Without foreign germ plasm, our farmers would supply little but cranberries, pecans and sunflower seeds.

The world's gene pools have already made a vital contribution to the pharmaceutical and agricultural industries, yet only 1 percent of all species have been examined for commercial value. The gathering rate of extinction can best be slowed by preserving habitat, particularly in the tropics where diversity of species is richest. But this means denying certain uses of land to those with shorter-term purposes. Governments that might look to the United States will find little practical help, or example.

The Reagan Administration proposes to cut back its already meager contributions to the United Nations Environment Program and to the tropical biology efforts of the National Science Foundation. A major function of the Endangered Species Act—the listing of threatened species—has been brought to a virtual halt by Interior Secretary James Watt. The act, which Congress must renew this year, is under attack from mining and forestry interests.

"Any species is expendable somewhere along the line except mankind," says lobbyist for the pesticide makers. If Washington shares that view, it will find it has little standing with governments on whom it may one day wish to urge the case for conservation of the planet's fast-shrinking gene pools.

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APPENDIX 22

[From the Washington Post, Mar. 29, 1982]

Study Says World Economy Periled by "Biological Deficit Financing" [1]

(By United Press International)

The world is engaging in "biological deficit financing," bringing it to the edge of an environmental crisis that is undermining the global economy, the Worldwatch Institute contends in a study released over the weekend.

"Six Steps to a Sustainable Society," written by Lester Brown and Pamela Shaw, updates an earlier study by Brown, "Building a Sustainable Society." It was funded by the United Nations Fund for Population Activities.

"We are beginning to consume the productive resource base itself, in effect engaging in biological deficit financing," the study said.

"Increasingly, current needs are being satisfied at the expense of future generations," it said. "These new circumstances call for a new approach to national policymaking, one that relies less on traditional economic approaches and more on environmental and population policies."

It said the unfolding conflict between human demands and a deteriorating environmental support system is most visible in Africa, which has the highest population growth rate of any continent while suffering from widespread soil erosion and expanding desert areas.

"With one-fifth to one-third of the world's cropland now losing topsoil at a rate that is undermining productivity, the need for a greatly expanded world-wide soil conservation effort is obvious," the study said.

"Conservation practices such as terracing, contour farming, strip-cropping and minimum tillage will be needed on several hundred million acres," it said.

It said family planning must become an increasingly important national priority, especially in the Third World, where the price for failing to slow population growth is a falling standard of living.

Brown and Shaw argued that United Nations projections showing world population growing from 4.4 billion today to 10.5 billion before stabilizing "are not realistic."

They urged instead a concerted effort to bring population growth to a halt about 6 billion people by the year 2020.

"Aside from family planning," the study said, "few activities can contribute more to the evolution of a sustainable society than planting trees. Each year the land in forests shrinks by an area the size of Hungary."

The study said the days of the "throwaway society" are numbered because discard materials are "thrown away energy."

Brown and Shaw urged creation of a more energy-efficient society. They said that despite the current gasoline glut, the curtain is falling on the petroleum age.

The study said coal and nuclear power will play a transitional role in creating an energy-efficient society, "but over the long term, renewable sources of energy are the world's best hope." It singled out hydropower, firewood, solar collection and energy crops.

"The great difficulty in building a sustainable society lies in both the scale of the undertaking and its urgency," the study concluded. "It is a challenge heightened by the growing recognition of the consequences of failure."

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APPENDIX 23

[From the New York Times, Apr. 18, 1982]

Reserve Proposed for Rain Forests [1]

BIOLOGIST PROPOSES SPENDING BILLIONS TO RESCUE TROPICAL REGIONS IN 49 NATIONS

(BY BAYARD WEBSTER)

A Smithsonian Institution biologist who has studied the world's tropical forests for the last 15 years has proposed a novel plan to preserve a portion of the rapidly diminishing rain forests, which contain about half the earth's plant and animal species.

The proposal calls for establishing a multibillion-dollar system of Tropical Moist Forest Reserves, which would be financed by more than 40 of the developed nations in the temperate zone and administered by an international organization such as the World Bank.

Under the plan, more than 1,000 reserves of approximately 250,000 acres each would be set aside in the 49 nations that have the bulk of the rain forests. This would mean that about 250 million acres would be protected, or about one-tenth of the world's estimated 2.5 billion acres of moist forests.

The plan was presented yesterday by Dr. Ira Rubinoff, director of the Smithsonian Tropical Research Institute in Panama, at a scientific symposium entitled the Tropical Rain Forest at the University of Leeds in England. The weeklong conference, which ends today, was attended by about 400 scientists and forest managers from 40 countries.

FORESTS DISAPPEARING RAPIDLY

The biologist told the conference that the urgency of beginning such a system was underscored by the rapid rate at which the tropical moist forests that girdle the equatorial regions are disappearing.

Scientists believe that an area of tropical forest about half the size of California is being lost each year. If that rate continues, half of the remaining tropical forests will disappear by the end of the century. Latin America is believed to have already lost 37 percent of its original tropical moist forest, Asia 42 percent and Africa 52 percent.

Within these tropical areas, the largest diversity of animal and plant life, nearly half of the earth's distinct life forms, or about 2 million species, is believed to be packed together on about 10 percent of the land's surface.

"If deforestation continues at the present rate," the Smithsonian researcher said, "we may expect to witness the disappearance of almost a million species, many of which have potential benefits to mankind as sources of domesticated plants and animals, medicines, fibers and oils which will be lost forever along with the forests."

ORIGIN OF HALF THE WORLD'S DRUGS

Chemical ecologists have estimated that almost half of the world's medicinal drugs have originated or come from plants or animals in tropical forests.

Dr. Rubinoff said in a telephone interview that funds for the program would be collected on a pro rata basis from all countries whose residents had a per capita income of $1,500 or more. This would yield a total of more than $3 billion annually.

According to the plan, each host nation would receive an annual payment, based on the size of the area under protection, to act as custodian of the reserve. Maintenance would be monitored by annual inspections, and payments would be reduced if an area was diminished. Thus, host nations would have an economic incentive to protect their reserves rigorously, Dr. Rubinoff said.

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The funds would be distributed to participating nations by an organization such as the World Bank. In addition, to ease the economic pressures for deforestation and the continued harmful exploitation of the forests, the funds would cover other programs such as public education presentations.

"To implement such a program," Dr. Rubinoff said, "we will have to get many countries and international organizations interested in it. And this will require vigorous lobbying by nongovernmental conservation groups."

FUNDS TO DEVELOP AGRICULTURE

In his 30-page paper outlining the plan, released in Washington by the Smithsonian, Dr. Rubinoff said that, where necessary, funds would be provided for agricultural development in other regions of the host nation. This would ease the pressure on the reserve to provide new agricultural land, one of the prime causes of deforestation.

"The World Bank, with its expertise in such activities, would be the ideal organization to run such programs," Dr. Rubinoff added.

Many suggestions for halting deforestation recognize the need for the richer countries to pay all or part of the costs of protecting and managing critical areas, he said. But none of these well-intentioned plans are being pursued fast enough to prevent the devastation of tropical forests or at sufficient financing levels to have a significant impact, he added.

Dr. Rubinoff said he thought that the payments to the underdeveloped nations where the forests lie should not be regarded by developed nations as altruistic.

"These are self-serving expenditures that developed nations should pay now for their one future security," he said. "They will be investing in a trust whose aims would be to protect the diversity of life in tropical forests for the ultimate benefit of everyone."

The conference was sponsored by the British Ecological Society and the Leeds Philosophical and Literary Society and was financed by the Royal Society, the World Wildlife Fund, the Scientific Exploration Society and the British Council.

APPENDIX 24

[From the New York Times, Apr. 1, 1982]

SCIENTISTS MODERATE ESTIMATES OF OZONE DEPLETION [1]

WASHINGTON, Mar. 31.—The National Research Council today cut by more than half its previous estimate of how much the earth's protective layer of ozone was being depleted by man-made chlorofluorocarbons released into the atmosphere, although it indicated it still saw reason for concern.

The council, an arm of the National Academy of Sciences, also moderated its assertion that ozone depletion is linked to increases in melanoma, an often-fatal skin cancer, and damage to food crops.

However, the report also said that the latest evidence added to fears that ozone depletion would cause substantial increases in the rates of other, less hazardous, forms of skin cancer and may have a previously unsuspected negative effect on human immune responses.

Ozone in the upper atmosphere protects humans by screening out ultraviolet light from the sun. In recent years, concern has been mounting that chlorofluorocarbons, which are used as propellants in spray cans, as foam-blowing agents and in refrigeration systems, are reaching the upper atmosphere and displacing the natural ozone.

Two years ago, an academy report called on the United States to lead a global effort to curtail fluorocarbon use, and many countries have banned them in spray cans. At that time, the academy study panel predicted the Earth's ozone envelope would be depleted by 15 to 18 percent if 1977 rates of fluorocarbon use continued. This prediction was reduced today to 5 to 9 percent.

Nevertheless, the chairman of one of the committees, Dr. Richard B. Setlow of the Brookhaven National Laboratory, said it would be only "prudent" to continue to suppress fluorocarbon use. Noting that the study found that a 1 percent decrease in ozone could lead to a 10 percent increase in skin cancers, he said that even the reduced predictions mean a 50 to 90 percent increase in such cancers.

The revised prediction, made by two panels of scientists who were asked to update the original academy report for the Environmental Protection Agency, was based on new observations of chemical reactions in the lower part of the stratosphere, which extends from about 6 to 30 miles above the earth. These observations were used in mathematical models projecting ozone concentrations over many decades.

SKIN CANCER TIED TO EXPOSURE

On the question of human health, the report says that skin cancers other than malignant melanoma are overwhelmingly linked to excessive exposure to sunlight. But, it said, there is insufficient evidence implicating ultraviolet light as the main cause of the more serious malignant melanoma. "Therefore," the report said, "it is not appropriate to make quantitative predictions about the increase in the incidence of this disease associated with a decrease in ozone."

Last week, Dr. F. Sherwood Rowland of the University of California at Irvine, who originally raised the alarms about ozone depletion in 1974, reported that chlorofluorocarbon concentrations in the air had tripled in the last 10 years. The new academy report implies that this may not be as dangerous as first suspected.

The report noted that a buildup of nitrous oxide from combustion, aircraft exhaust and agricultural and waste disposal practices could add to the ozone depletion problem.

The report was compiled by two panels, a committee on the chemistry and physics of ozone depletion headed by Charles H. Kruger Jr. of Stanford University, and a committee on the biological effects of increased solar ultraviolet radiation, led by Dr. Setlow. Copies of the report, "Causes and Effects of Stratospheric Ozone Reduction: An Update," are available for $13.95 each from the National Academy Press, 2101 Constitution Ave., N.W., Washington, D.C. 20418.

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APPENDIX 25

[From the New York Times, Editorial, Apr. 1, 1982]

A RESCUE OF SEA LAW [1]

The Reagan Administration seems to have struck a decent deal to preserve the chances for a global law of the sea. It traded some capitalist philosophy for higher capitalist profits.

Swallowing ideology, the Administration gave third-worlders their theory about the common ownership of ocean resources. It agreed to form a cartel that will, eventually, limit the mining of the seabed's immense riches—nodules of manganese, cobalt, nickel and copper. Swallowing almost as hard, the poorer countries agreed to give a monopoly on such mining for an extended period to seven pioneering Western companies, four of them linked to American corporations.

A fair trade? Not on economic grounds. The losers, if this treaty is adopted, would be consumers everywhere. Prices for key minerals are likely to be held higher to sustain less efficient producers, not all from backward countries.

What nonetheless argues for the deal is that it clears a path for a treaty offering many other benefits. Eight years in the writing, the draft would end the interminable, sometimes violent quarrels over territorial waters. It would fix a universal territorial limit 12 miles out to sea and extend an "exclusive economic zone" 200 miles out. Thus to end the miserable fishing wars is itself worth a lot. So are the provisions that would make ships safer, protect whales, encourage marine research and assure unimpeded passage through strategic straits.

Only a year ago, the Reagan Administration scoffed at the Law of the Sea as soppy globaloney. The Carter Administration's delegation was fired out of hand, as if it had done something disgraceful. There was a great deal of huffing in Washington about how the seabed ought to be open to anyone with the billions needed to mine it.

For a time, it looked as if the United States had isolated itself and destroyed a great legal enterprise begun by Americans. Maybe it was all a show, to wring the last commercial benefit from the bargaining. Maybe someone at the State Department finally noticed that the world was round. Maybe the Pentagon prevailed with its concern for free passage by military vessels.

Whatever the motives, give praise for this rescue to the new American negotiator, Leigh Ratiner, and two diplomats, Tommy Koh of Singapore and Paul Engo of the Cameroons. Most nations will probably sign on within a fortnight. And the Reagan team, having been so difficult, should have an excellent chance of gaining the Senate's consent.

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APPENDIX 26

Letter Dated June 14, 1982, Form Subcommittee Chairman Bonker to Foreign Affairs Committee Chairman Zablocki Enclosing a Trip Report Concerning the United Nations Environment Program's Nairobi Conference (May 10–18, 1982).

Congress of the United States
Committee on Foreign Affairs
House of Representatives
Washington, D.C. 20515

June 14, 1982

The Honorable Clement J. Zablocki
Chairman
Committee on Foreign Affairs
2170 Rayburn House Office Building
INSIDE MAIL

Dear Mr. Chairman:

I am submitting for the Committee's use the attached trip report on the United Nations Environment Program's Governing Council Session of a Special Character, held in Nairobi, Kenya from May 10-18, 1982. The report was prepared by Ms. Carole A. Grunberg, of the Subcommittee staff, who served on behalf of the Committee as a Congressional Staff Observer on the U.S. Delegation.

The report highlights the convergence of opinion among the industrailized and developing countries that has taken place during the last decade on global environmental problems. It also stresses that U.S. participation in the Special Session reflects an abdication of long-standing U.S. leadership in international environmental affairs.

I hope the report will be useful to the Committee in its future consideration of global environmental issues.

Sincerely yours,

Don Bonker

Don Bonker, Chairman
Subcommittee on Human Rights and
International Organizations

DB:cgc
Enclosure

REPORT ON THE UNITED NATIONS ENVIRONMENT PROGRAM'S SESSION OF A SPECIAL CHARACTER

MAY 10-18, 1982, NAIROBI, KENYA

I.

SUMMARY

Delegations from 105 countries assembled in Nairobi, Kenya from May 10-18, 1982 for the United Nations Environment Program's Governing Council Session of a Special Character (SOSC) to commemorate the tenth anniversary of the U.N. Stockholm Conference on the Human Environment.

The Special Session adopted by consensus two important documents: the Nairobi Declaration and a Decision (new Plan of Action). The Nairobi Declaration reaffirms the commitment to the Stockholm Declaration, and calls for strengthening and expanding efforts to protect the global environment. The Decision reviews the principal achievements and failures in implementing the Stockholm Action Plan, and sets forth priorities for UNEP and the U.N. system as a whole in the decade 1982-1992. The Session of a Special Character also adopted four resolutions, including one on arms and the environment and one recommending the UNEP Governing Council consider the creation of an expert commission to propose long-term environmental strategies to achieve sustainable development to the year 2000 and beyond. Several countries, including Finland, Japan, Libya, the Netherlands and the U.K., announced increased pledges to UNEP, totalling nearly $3 million.

A high-level delegation represented the U.S. The co-chairs of the U.S. Delegation were Mrs. Anne Gorsuch, Administrator of the Environmental Protection Agency, Mr. Alan Hill, Chairman of the Council on Environmental Quality, and Mr. James Buckley, Under Secretary of State for Security Assistance, Science and Technology. The eighteen other members of the Delegation included representatives from the Departments of State and the Interior, the Agency for International Development, the Environmental Protection Agency, private citizens and House and Senate Committee staff.

The U.S. achieved several of its principal objectives at the Conference: 1) encouraging broader support for international environmental programs; 2) preventing confrontation and polarization of differences between developed and developing nations; 3) limiting politicization; 4) underlining the need for better scientific analysis of environmental trends and problems as the basis for policymaking; and 5) clarifying priorities for and the role of UNEP. However, the Delegation failed in another important area: ensuring the U.S. is perceived as still being committed to protection of the global environment.

The type of American leadership exercised at the Stockholm Conference was sorely lacking in Nairobi. Industrialized and Third World nations alike recognized U.S. accomplishments and contributions to solving global environmental problems during the 1970's, but in private conversations many delegates questioned and, in some instances, severely criticized the present Administration's policies on world environmental issues. (Canada was the only country to criticize the U.S. publicly; the issue was acid rain.) The Administration was generally viewed as having abdicated U.S. leadership in international environmental affairs and even of being hostile to new initiatives in this area. Several nations, including Mexico, Japan, Canada, Norway and the U.K., unsuccessfully attempted to fill the leadership void.

Although all countries, except for the U.S., recommitted themselves to the Stockholm principles and called for a renewal of the "spirit of Stockholm," a "spirit of Nairobi" did not develop. Nevertheless, the Conference demonstrated a convergence of views among the developed and developing countries on the importance of protection and conservation of the world's environment and natural resources. The Conference marked a turning point in the process of moving from an institution-building decade to solving environmental problems themselves. The optimism of Stockholm gave way to a sober recognition of the urgent need to tackle difficult environment and natural resource problems in the Nairobi Decade.

II.

U.S. DELEGATION, GOALS AND ACCOMPLISHMENTS

A. DELEGATION

As mentioned above, the U.S. Delegation was co-chaired by Mrs. Anne Gorsuch, Mr. Alan Hill and Mr. James Buckley. Mrs. Gorsuch and Mr. Hill shared the Chairmanship from May 10-13; Mr. Hill led the Delegation on May 14 and 15; and was joined by Mr. Buckley for the last three days of the Conference, May 16-18.

Executive Branch advisers on the Delegation were: Mr. Ray Arnett, Assistant Secretary of the Interior; Mr. Paul Cahill, Director of EPA's Office of Federal Activities; Mr. Jacques Gorlin, Office of the AID Administrator; Mr. Gordon Brown and Mr. Dan Weygandt (last three days) of State Department's Bureau of International Organizations; and Mr. William Long of State Department's Bureau of Oceans, International Environmental and Scientific Affairs, Ms Denise Mitsteifer, Executive Assistant to Mrs. Gorsuch; and Mr. Peter DeCastro, Aide to Secretary Buckley also served on the Delegation Mr. Russell Train, President of World Wildlife Fund-U.S., and Mr. Archibald Hanson, a California businessman, served as public advisers to the Delegation. Congressional staff observers were Ms. Carole Grunberg, House Foreign Affairs Committee, Mr. Peter Galbraith, Senate Foreign Relations Committee, Ms. Jo Cooper, Ms. Katherine Cudlipp and Mr. Philip Cummings of Senate Environment and Public Works, Mr. James Green and Mr. Harold Hanson of House Science and Technology, and Mr. Martin Smith of House Energy and Commerce Committee.

B. GOALS

U.S. objectives for the SOSC were to ensure the U.S. is perceived as still being committed to protection of the global environment; to encourage broader support for international environmental programs; to work for consensus on the Conference documents; to avoid confrontation and polarization of differences between various regional groups and/or philosophies; to limit politicization; and to ensure the Conference documents reflect current Administration policies and priorities in global environmental affairs.

The U.S. worked to assure that its interests and principles were reflected in the final text of the Declaration and to minimize objectionable language. The U.S. Delegation achieved these goals to a certain extent. The U.S. succeeded in preserving UNEP's catalytic and coordinating role by eliminating language sponsored by Kenya and Tunisia (and supported by the African group and a number of Third World nations) that would have specifically directed UNEP to finance and implement country-specific projects. The U.S. also toned down language labelling the New International Economic Order as the major tool in the struggle to reverse environmental degradation, and in balancing this with language recognizing that market mechanisms can favor sound development and rational environment and resource management. Over U.S. objection, the Conference agreed to include in the Declaration references to the "inequitable distribution of resources," and to the threat the arms race and apartheid pose to the global environment. The U.S. persuaded Mexico to withdraw from the Declaration detailed language on arms and the environment, and, instead, to offer this language as a separate resolution in Plenary. The Declaration also calls upon multinational corporations to take account of their environmental responsibilities.

Regarding the Plan of Action, the U.S. preference was for the first of two drafts, containing a general set of recommendations. The U.S. sought to leave specifics for the annual Governing Council meeting, which immediately followed the SOSC. At the first meeting of the Committee of the Whole, which drafted the new Action Plan, only the U.S. and the Soviet Union supported the more general first option. The Committee of the Whole overwhelmingly agreed to use the second, detailed option as its drafting vehicle.

U.S. priorities for inclusion in the Action Plan were to strengthen scientific analysis; to encourage greater private sector involvement (by both industry and non-governmental organizations); to improve coordination and efficiency within the U.N. system; to gain broader support for UNEP; and to narrow the range of priorities for UNEP. The Committee of the Whole's final draft contains all but the last concern. The Action Plan assigns UNEP eighteen priorities in the areas of environmental assessment, management and supporting measures. The Action Plan specifically recognizes the achievements of industry and non-governmental organizations over the last decade, and calls upon UNEP to support non-governmental organizations in their efforts to increase environmental awareness.

The U.S. and other Western countries were successful in defeating the Kenyan-Tunisian initiative to expand UNEP's activities to include financing of country-specific projects. The Action Plan provides for UNEP undertaking limited, special assistance projects if extra funding becomes available. In conjunction with the PRC and several industrialized states, the U.S. also thwarted a Soviet-East European proposal to have UNEP undertake studies on peace, security and the environment by gaining amendments which referred these concerns to the U.N.'s Second Special Session on Disarmament. Finally, the U.S. and Western group restricted specific demands for technology transfer and increased development aid.

In the Administration's view, a major achievement was the inclusion in the final Declaration of a reference to market mechanisms. It reads: "Combinations of market and planning mechanisms can also favor sound development and rational environmental and resource management."

Two problems plagued the U.S. Delegation: 1) the perception that the present Administration is defensive and even hostile towards multilateral cooperation for resolving global environmental problems; and 2) the EPA and Interior representatives' lack of knowledge about UNEP and the U.N. system in general and about the development/environment problems of the Third World. These problems severely undermined the Delegation's effectiveness. In private conversations, delegations from both developed and developing countries expressed serious concern about the Reagan Administration's attitude and policies towards international organizations, citing the World Health Assembly's Code of Conduct on Infant Formula and the Law of the Sea negotiations as examples. They believed U.S. positions at the SOSC were but another step in a trend away from supporting multilateral cooperation to resolve common global problems. The U.S. statement in Plenary and unwillingness to support the Japanese proposal for an independent expert commission reinforced this view in the opening days of the SOSC.

The U.S. did make some notable and positive contributions to drafting the Declaration and Action Plan. The work of Gordon Brown and Bill Long, who were the principal American negotiators in the Working Group and Committee of the Whole respectively, should be recognized in this regard. Nevertheless, the overall performance of the U.S. Delegation tended to confirm the view that the Administration has reneged on previous Administrations' commitments to mutilateral cooperation in international environmental affairs.

III.

CONFERENCE STRUCTURE

The work of the SOSC took place in three different bodies and proceeded on the basis of consensus. General debate -- the fifteen-minute speeches of each delegation -- occurred in Plenary during the first week. On the final day of the SOSC, Plenary acted on the draft Declaration, the Action Plan and the resolutions. Substantive issues were hammered out in the Committee of the Whole and the Working Group.

The open-ended Committee of the Whole formulated a draft Decision (Action Plan) covering Conference agenda items 6 and 7: review of the major achievements in implementing the Stockholm Action Plan, future perspectives, action and international cooperation in the environmental field, and major trends for UNEP to address over the next ten years. The open-ended Working Group prepared the draft Nairobi Declaration.

The Committee of the Whole produced a consensus document; the Working Group reached consensus on all but two major points: language on the new international economic order and market mechanisms, and language on *apartheid* (Canada had reserved on this, preferring the language contained in the Stockholm Declaration principles). The Committees completed their work on the evening of May 17, and reported their draft to Plenary for final action on May 18.

A. PLENARY

The opening Plenary session elected the Hon. Peter Oloo-Aringo, Kenyan Minister for Environment and Natural Resources, President of the Conference. UNEP Executive Director Mostafa Tolba read messages from King Baudouin I of Belgium, the Premier of the State Council of China, Prime Minister Indira Gandhi, Peruvian President Belaunde Terry, King Gustaf of Sweden, Prince Hassan of Jordan, the Sultan of Oman and the U.N. Secretary General. The Speaker of the Swedish House of Parliament and Maurice Strong, President of the Stockholm Conference and the first UNEP Executive Director, then addressed the SOSC. Later in the week, Prince Claus of the Netherlands, President Nimeri of Sudan, and President Mobutu Sese Seko of Zaire addressed the Conference.

Plenary spent the first week listening to speeches from the 105 countries, non-governmental and international organizations participating in the SOSC. The speech of Indonesia's Minister of State for Development Supervision and Environment characterized those of many Third World nations. He viewed Nairobi as a turning point, and called for a renewal of the Stockholm momentum so as to face the future with confidence. He noted:

> Ironically, the Stockholm spirit has waned particularly among industrialized countries who were its strongest proponents. At the same time, among us in the developing countries who tended to be skeptical at first, it is only now that the Stockholm spirit is taking hold.

He called for greater regionalization of environmental efforts, broader participation by non-governmental organizations, and strengthening UNEP's leverage with other U.N. agencies. Emphasizing the Third World's desire to expand UNEP's role beyond that of catalyst and coordinator, he pointed out that UNEP had served the industrialized nation's interests during the last decade and must now turn its attention to the developing countries' concerns. UNEP's priorities in the Nairobi Decade should focus on the areas of research, development of less or non-polluting industrial technology, information exchange, and raising awareness of environmental problems.

Many delegations, including the U.S., described their activities during the last decade in the legislative, administrative, institutional, and scientific fields for protection and improvement of the environment. The wide-ranging and impressive list of accomplishments indicated the increasingly serious attention paid to environment and natural resource problems. All delegations praised UNEP's work, and attributed its failures to inadequate financial support and a lack of political will on the part of individual governments. There was broad agreement that development assistance must be based on sound environment and natural resource protection and management. Likewise, most delegations highlighted the urgent need for more generous contributions to UNEP. Issues receiving special attention were improvement of forecasting techniques, soil degradation, desertification, deforestation, control of hazardous wastes and exports, and transboundary air pollution. A number of countries emphazised the crucial importance of improved environmental training and management.

B. COMMITTEE OF THE WHOLE

The Committee of the Whole (COW) spent seven long and difficult days to reach consensus on the draft Decision, or new Plan of Action. Without the expert leadership of Dr. Martin Holdgate (U.K. Department of the Environment) as Chairman of the COW, it is unlikely a consensus would have been attained on such a wide range of issues.

Parts I and II of the Action Plan, which list the major achievements in implementing the Stockholm Action Plan and new perceptions of environmental issues, parallel closely the views expressed during the Subcommittee on Human Rights and International Organizations' three days of hearings on the SOSC. Progress is generally considered as being fair-to-good in executing the Stockholm Action Plan. The most noteworthy change in perception, reflected throughout the document, is the emphasis placed on the relationship between development and economic growth and environment and natural resource protection and management. The text reads: "wise use of resources and enlightened conservation strategies are consistent with the economic growth imperative and should be considered prerequisites for sustainable growth."

Parts III through VII cover potential problems, priorities for action by the U.N. system and directives for UNEP. Part III, on trends, is a laundry list of problems and priorities in the following categories: atmosphere, oceans, water, lithosphere, terrestrial biota, population and human settlements, health, energy, industry and other economic development, and peace, security and the environment. The last item, proposed by the U.S.S.R. and East European group, generated heated debate. The compromise language, which the U.S. proposed, reads:

> Trends and problems: Continuing increase in the production, stockpiling and risk of use of weapons of mass destruction and the development of new types of chemical and bacteriological weapons not only pose a major threat to the environment and even to life on earth, but also compete for limited resources that could be better used for constructive purposes. Priority for action: In support of the continuing efforts of the U.N. General Assembly, and especially in its special session on Disarmament and the Disarmament Committee, to ensure that the environmental implications of existing and new types of armaments and warfare are taken into account.

Section IV - future orientation of UNEP - also proved troublesome. Kenya and Tunisia, backed by the African group and many Asian countries, attempted to broaden UNEP's mandate to include practical aid to developing nations and direct involvement in project execution. The U.S. and Western group successfully opposed this initiative, arguing that UNEP should continue to serve as a catalyst and coordinator for environmental issues within the U.N. system and that the lack of financial resources precluded UNEP from assuming any new program responsibilities.

C. WORKING GROUP

The Working Group's draft Declaration presents a general policy statement on the global environment. It recognizes progress achieved since Stockholm in environmental protection, reaffirms the Stockholm Declaration as a "valid code of conduct for the years to come," and sets forth priority areas for the Nairobi Decade. The Declaration highlights the relationship between environment and development, emphasizes the need for improved forecasting and more preventive action so as to avoid "the burdensome and expensive repair of damage already done." The responsibility of all governments to act individually and collectively to enhance environmental protection and natural resource conservation and management is stressed.

Developing countries participated actively in the Working Group; their concerns are reflected throughout the document. However, the Western Group limited or eliminated most specific references to the New International Economic Order, apartheid, multinationals, the arms race, and demands for technology transfer and increased development aid. Mexico, as noted above, agreed to withdraw its proposed language on the threat of nuclear war, and offered this as a separate resolution in Plenary.

The U.S. held out for inclusion of language on "market mechanisms" to balance the reference to a new international economic order. This produced an extended debate, and consensus could not be reached. As reported to Plenary, the language on "market mechanisms" and "new international economic order" was bracketed. Only after several hours of debate late in the evening of the last day was an acceptable compromise agreed (see II. B. above).

The Declaration singles out the problems of deforestation, soil and water degradation, desertification, atmospheric changes such as the ozone layer, CO_2 buildup and acid rain, pollution of the seas and inland waters, hazardous substances, and the extinction of plant and animal species for special mention.

IV.

MAJOR ISSUES AND PROPOSALS

Among the perennial North-South issues, the drafting committees spent a great deal of time debating the threat the arms race and nuclear weapons pose to the environment. The non-governmental organizations, which had met during the week prior to the SOSC, had adopted a resolution on this issue and actively lobbied for its inclusion in the Declaration. The Mexican resolution on arms and the environment was adopted by consensus in Plenary. The operative sections:

> Appeal to Governments and the world community as a whole
> to do the utmost to halt the arms race and thereby prevent
> a major threat to the environment, and
> Request the U.N. Secretary General to bring this appeal to
> the attention of the second General Assembly special session
> devoted to disarmament.

The Kenyan-Tunisian proposal on broadening UNEP's mandate also consumed a significant amount of time, and is discussed above.

Two resolutions adopted by the non-governmental organizations, one on multinationals and one on Antarctica (which would direct the U.N. to assume a leading role in this area), did not surface as separate resolutions. Langauge on multinationals is included in the Declaration: "All enterprises, including multinationals, should take account of their environmental responsibilities when adopting industrial production methods or technologies, or when exporting them to other countries."

Two major proposals came from Japan. One called for the designation of a U.N. Decade for the Environment, one year of which would be set aside as the International Year of the Environment to increase global awareness of environmental problems.

The second proposal called for the creation of an independent expert commission to develop long-term strategies to achieve sustainable development to the year 2000 and beyond. The notion was based on several recent reports: the Okita report, the Brandt Commission report, and Global 2000.

The initial Japanese proposal was rather vague and was received with a moderate degree of enthusiasm. The Soviet, East European plus a number of Third World delegations believed the funds to support the commission should be spent addressing their problems, and thus opposed the idea.

In refining the proposal the key question became whether the commission should report its findings directly to the U.N. General Assembly, as Japan sought, or report to the General Assembly through the UNEP Governing Council, which the U.S. and UNEP Secretariat advocated. Other questions involved the commission's composition, who would define its terms of reference, and financing (i.e., through voluntary contributions or through the regular, U.N. assessed budget).

During the final Plenary session, the UNEP Secretariat offered a substitute proposal which placed the commission squarely under UNEP's auspices. The Governing Council would decide whether to recommend to the U.N. General Assembly the creation of an expert commission; the Governing Council would decide its terms of reference; financing would be through voluntary contributions; the commission would report its findings within two years to the General Assembly through the Governing Council; and the U.N. Secretary General would appoint the head of the commission.

Japan objected to the substitute and called for a procedural vote on the competence of the SOSC to consider the resolution. Plenary voted 49-6-13 that the SOSC could consider the resolution. Japan then called for a vote on the substitute itself. The U.S. voted in favor of the proposal, which passed 40-14-8.*

V.

PARTICIPATION AND POLITICIZATION

Among the 105 countries participating in the SOSC, all of the Organization for Economic Cooperation and Development members were represented. The entire East European group participated. Of the regional groups, the largest number came from Africa, with 28 countries. The Arab states were also strongly represented, with 14 nations. Sixteen Asian and thirteen Latin American countries participated.

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* The 1982 UNEP Governing Council postponed action on the Japanese proposal for one year so that the Executive Director could consult with Governments on the idea. Observers now believe Japan will pursue its proposal through separate, non-U.N. channels.

The African National Congress, League of Arab States, PLO and Pan African Congress participated as observers from liberation movements. Nearly all U.N. organizations sent representatives as did many intergovernmental organizations, like the OECD and the International Union for the Conservation of Nature.

The non-governmental organizations turned out in full force. More than 100 NGO's participated in the SOSC as observers, ranging from such well-known groups as the Sierra Club, Friends of the Earth and World Wildlife Fund to groups like the Bombay Civic Trust, the Ghana Young Farmers and the Korean Environmental Preservation Association.

Bloc voting was much less prevalent than in other U.N. conferences. The two questions in which blocs played a noteworthy role were the Kenyan-Tunisian attempt to broaden UNEP's mandate (which the Africans strongly supported), and the resolution in Plenary regarding Israel's construction of a canal linking the Mediterranean and Dead Seas (which the Arab and African groups co-sponsored).

Politicization was also less of a factor in the Nairobi meeting. The Mexican and Soviet initiatives relating to arms and the environment, discussed above, the Nigerian and Ethiopian language on apartheid and the environment, and the Arab resolution on construction of the Mediterranean-Dead Seas canal were the primary examples.

The resolution on Israel, initiated jointly by the Arab and African groups, plus India and Pakistan, had its origins at the 1981 U.N. Conference on New and Renewable Sourcesof Energy, which adopted a similar resolution. It calls upon the UNEP Executive Director to prepare a study on "any adverse environmental implications resulting from the Israeli decision to change the nature and environmental conditions of the occupied and Jordan territories" by building a canal to link the Mediterranean and Dead Seas, and to present the study to the 11th Governing Council (1983). The U.S. opposed the resolution as "inappropriate" and "duplicative" because the 1981 U.N. General Assembly had already requested such a study (due in June 1982). The resolution passed 60-2-36. Abstentions included the OECD members (which objected to the word "adverse"), Chile, Jamaica, Malawi, Papua New Guinea and Zimbabwe.

Argentina had intended to introduce a resolution on the Falkland Islands, but was prevailed upon simply to circulate a one-page letter on behalf of the Non-Aligned Movement reaffirming the NAM's recognition of Argentine sovereignty over the Malvinas Islands. The U.K. let it be known that the introduction of a resolution on the Falklands would force it to reconsider its participation in UNEP.

The PLO Observer's speech was comparatively mild, and focused on Palestinians' land and water rights. The U.S. persuaded Israel not to exercise its right of reply to the PLO speech.

Other incidents of politicization included a debate between India and Bangladesh over diversion of water from the Ganges, an exchange between Greece and Turkey over Cyprus, and a heated debate between the Soviets and East Europeans, and the PRC and Democratic Kampuchea over the latter's credentials. The Soviets also protested the presence on the FRG Delegation of an environment minister whose department is located in West Berlin.

VI.

CONGRESSIONAL REPRESENTATION

Staff from three House and two Senate Committees which oversee environmental issues represented Congress. At a briefing for the U.S. Delegation prior to the Nairobi meeting, Secretary Buckley welcomed and encouraged full Congressional staff participation on the U.S. Delegation. However, Secretary Buckley was not present for the first week of the SOSC, and staff were disinvited to the first Delegation meeting in Nairobi. Mrs. Gorsuch informed staff that the Delegation had decided at that meeting to use Congressional participants to cover reporting on the 15-minute speeches in Plenary, although Embassy personnel are normally assigned to routine reporting duties in international conferences. After the first Delegation meeting, staff were included in all scheduled morning and evening Delegation meetings.

Several staff participated actively in the Delegation's meetings, and in the formulation of positions. Several staff also assisted in preparing U.S. interventions in the Committee of the Whole and Working Group.

Many delegations and foreign, non-governmental organizations were very interested in Congressional views on and involvement in the preparation of U.S. policy on international environmental issues. Copies of the Subcommittee on Human Rights and International Organizations' summary of hearings were distributed to all delegations and to many non-governmental groups. Copies of Section 118, Environment and Natural Resources, of the Foreign Assistance Act were made available to interested persons. Senate Resolution 49, which Senator Pell successfully sponsored in 1978 and which calls on the U.S. to propose a treaty requiring an International Environmental Assessment for any major activity which may adversely affect the environment, was also widely distributed. Congressional staff held several meetings with non-governmental groups, many of whom requested further information on the manner in which AID factors environmental considerations into its projects.

In general, Congressional staff participation was well received and contributed to a more balanced view of American concern for global environmental problems than was apparent from the U.S. Delegation's official positions.

VII.

CONCLUSION

The Nairobi Conference lacked the spirit, excitement and sense of anticipation of the Stockholm Conference, according to those who participated in both meetings. However, the sober tone prevalent throughout the session reflected many countries' recognition of the difficulty in dealing with the numerous and serious environmental problems the world community will face in the coming decade. The key question that emerged from the SOSC is whether nations will move beyond rhetoric to commit the resources required to solve global environmental problems. The institutions and technology now exist to address many of the priorities set forth in the Nairobi Action Plan; the Nairobi Declaration sets forth the commitment. But will countries, individually and collectively, exercise the political will to translate the two into practice?

The lack of strong leadership by any one country contributed in part to the inability to generate a "spirit of Nairobi." As Maurice Strong observed at a press conference early in the session: "It is quite clear that the U.S. role at this meeting is in stark contrast to its leadership role in Stockholm." The U.S., rather than building upon its outstanding record in world environmental affairs and seizing the initiative, assumed a defensive, "damage-limitation" posture. Apart from a divergence of views between the U.S. and a majority of countries over policies and strategies, the lack of knowledge about UNEP and the U.N. system and inexperience in U.N. conferences cost the U.S. Delegation a great deal of credibility during the first week of the Conference. The U.S. was generally considered to have reneged on its long-standing commitment to and leadership in global environmental affairs.

In a more positive vein, it is unlikely that high-level Administration officials would have focused on global environmental issues without the SOSC. The Conference forced the Administration to address problems in this field. In addition, the SOSC provided a rather unique opportunity for new, senior officials in EPA and the Interior Department to gain first-hand exposure to the views of other developed and developing nations on international environmental problems.

The most important achievement of the SOSC was that it demonstrated the extent to which attitudes towards environmental problems have changed over the last decade. The focus has shifted from the industrialized countries' concern with pollution to an acceptance, especially by the Third World, of the notion that economic growth and development are inextricably linked to environmental protection and natural resource conservation and management. In the decade ahead, it may well be the developing countries which serve as the engine pulling the world community along the track towards a sustainable global environment.

The ultimate success of the Session of a Special Character will be determined by the political will to act on the principles and priorities established in Nairobi.

LIST OF COUNTRIES PARTICIPATING IN THE UNEP SESSION OF A SPECIAL CHARACTER

Algeria
Argentina
Australia
Austria
Bahrain
Bangladesh
Barbados
Belgium
Benin
Brazil
Bulgaria
Burundi
Byelorussian SSR
Canada
Chad
Chile
China
Colombia
Comoros
Costa Rica
Cyprus
Czechoslovakia
Democratic Kampuchea
Democratic People's Republic of Korea
Democratic Yemen
Denmark
Ecuador
Egypt
Ethiopia
Finland
France
Gabon
Gambia
German Democratic Republic
Federal Republic of Germany
Ghana
Greece
Guinea
Holy See
Hungary
Iceland
India
Indonesia
Iraq
Ireland
Israel
Italy
Ivory Coast
Jamaica
Japan
Jordan
Kenya
Kuwait
Lebanon
Lesotho
Liberia
Libyan Arab Jamahiriya
Malawi
Malaysia
Mali
Mauritania
Mexico
Morocco
Netherlands
New Zealand
Nicaragua
Nigeria
Norway
Oman
Pakistan
Papua New Guinea
Peru
Philippines
Poland
Portugal
Republic of Korea
Romania
Rwanda
Saudi Arabia
Senegal
Seychelles
Somalia
Spain
Sri Lanka
Sudan
Swaziland
Sweden
Switzerland
Thailand
Togo
Tunisia
Turkey
Uganda
Ukranian SSR
U.S.S.R.
United Arab Emirates
U.K.
United Republic of Tanzania
U.S.A.
Uruguay
Venezuela
Yugoslavia
Zaire
Zambia
Zimbabwe

APPENDIX 27

UNITED NATIONS ENVIRONMENT PROGRAMME NAIROBI DECLARATION ADOPTED BY THE SESSION OF A SPEICAL CHARACTER, MAY 19, 1982.

United Nations
Environment
Programme

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19 May 1982

ORIGINAL: ENGLISH

GOVERNING COUNCIL
Tenth session
Nairobi, 20 May-2 June 1982
Item 4 of the provisional agenda

NAIROBI DECLARATION

Declaration adopted by the session of a special character

The world community of States, assembled in Nairobi from 10 to 18 May 1982 to commemorate the tenth anniversary of the United Nations Conference on the Human Environment, held in Stockholm, having reviewed the measures taken to implement the Declaration and Action Plan adopted at that Conference, solemnly requests Governments and peoples to build on the progress so far achieved, but expresses its serious concern about the present state of the environment world-wide, and recognizes the urgent necessity of intensifying the efforts at the global, regional and national levels to protect and improve it.

1. The Stockholm Conference was a powerful force in increasing public awareness and understanding of the fragility of the human environment. The years since then have witnessed significant progress in environmental sciences; education, information dissemination and training have expanded considerably; in nearly all countries, environmental legislation has been adopted, and a significant number of countries have incorporated within their constitutions provisions for the protection of the environment. Apart from the United Nations Environment Programme, additional governmental and non-governmental organizations have been established at all levels, and a number of important international agreements in respect of environmental co-operation have been concluded. The principles of the Stockholm Declaration are as valid today as they were in 1972. They provide a basic code of environmental conduct for the years to come.

2. However, the Action Plan has only been partially implemented, and the results cannot be considered as satisfactory, due mainly to inadequate foresight and understanding of the long-term benefits of environmental protection, to inadequate co-ordination of approaches and efforts, and to unavailability and inequitable distribution of resources. For these reasons, the Action Plan has not had sufficient impact on the international community as a whole. Some uncontrolled or unplanned activities of man have increasingly caused environmental deterioration. Deforestation, soil and water degradation and desertification are reaching alarming proportions, and seriously endanger the living conditions in large parts of the world. Diseases associated with adverse environmental conditions continue to cause human misery. Changes in the atmosphere - such as those in the ozone layer, the increasing concentration of carbon dioxide, and acid rain - pollution of the seas and inland waters, careless use and disposal of hazardous substances and the extinction of animal and plant species constitute further grave threats to the human environment.

3. During the last decade, new perceptions have emerged: the need for environmental management and assessment, the intimate and complex interrelationship between environment, development, population and resources and the strain on the environment generated, particularly in urban areas, by increasing population have become widely recognized. A comprehensive and regionally integrated approach that emphasizes this interrelationship can lead to environmentally sound and sustainable socio-economic development.

4. Threats to the environment are aggravated by poverty as well as by wasteful consumption patterns: both can lead people to over-exploit their environment. The International Development Strategy for the Third United Nations Development Decade and the establishment of a new international economic order are thus among the major instruments in the global effort to reverse environmental degradation. Combinations of market and planning mechanisms can also favour sound development and rational environmental and resource management.

5. The human environment would greatly benefit from an international atmosphere of peace and security, free from the threats of any war, especially nuclear war, and the waste of intellectual and natural resources on armaments, as well as from *apartheid*, racial segregation and all forms of discrimination, colonial and other forms of oppression and foreign domination.

6. Many environmental problems transcend national boundaries and should, when appropriate, be resolved for the benefit of all through consultations amongst States and concerted international action. Thus, States should promote the progressive development of environmental law, including conventions and agreements, and expand co-operation in scientific research and environmental management.

7. Environmental deficiencies generated by conditions of underdevelopment, including external factors beyond the control of the countries concerned, pose grave problems which can be combated by a more equitable distribution of technical and economic resources within and among States. Developed countries, and other countries in a position to do so, should assist developing countries, affected by environmental disruption in their domestic efforts to deal with their most serious environmental problems. Utilization of appropriate technologies, particularly from other developing countries, could make economic and social progress compatible with conservation of natural resources.

8. Further efforts are needed to develop environmentally sound management and methods for the exploitation and utilization of natural resources and to modernize traditional pastoral systems. Particular attention should be paid to the role of technical innovation in promoting resource substitution, recycling and conservation. The rapid depletion of traditional and conventional energy sources poses new and demanding challenges for the effective management and conservation of energy and the environment. Rational energy planning among nations or groups of nations could be beneficial. Measures such as the development of new and renewable sources of energy will have a highly beneficial impact on the environment.

9. Prevention of damage to the environment is preferable to the burdensome and expensive repair of damage already done. Preventive action should include proper planning of all activities that have an impact on the environment. It is also important to increase public and political awareness of the importance of the environment through information, education and training. Responsible individual behaviour and involvement are essential in furthering the cause of the environment. Non-governmental organizations have a particularly important and often inspirational role to play in this sphere. All enterprises, including multinational corporations, should take account of their environmental responsibilities when adopting industrial production methods or technologies, or when exporting them to other countries. Timely and adequate legislative action is important in this regard.

10. The world community of States solemnly reaffirms its commitment to the Stockholm Declaration and Action Plan, as well as to the further strengthening and expansion of national efforts and international co-operation in the field of environmental protection. It also reaffirms its support for strengthening the United Nations Environment Programme as the major catalytic instrument for global environmental co-operation, and calls for increased resources to be made available, in particular through the Environment Fund, to address the problems of the environment. It urges all Governments and peoples of the world to discharge their historical responsibility, collectively and individually, to ensure that our small planet is passed over to future generations in a condition which guarantees a life in human dignity for all.

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APPENDIX 28

UNITED NATIONS ENVIRONMENT PROGRAMME DRAFT DECISION BY THE GOVERNING COUNCIL AT ITS SESSION OF A SPECIAL CHARACTER, MAY 17, 1982.

[illegible]
Prepared by Committee of Whole

Final version

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DRAFT DECISION BY THE GOVERNING COUNCIL AT ITS SESSION OF A SPECIAL CHARACTER

The Governing Council,

Having met in Nairobi from 10 to 13 May 1982 in a session of a special character to commemorate the tenth anniversary of the United Nations Conference on the Human Environment, held at Stockholm from 5 to 16 June 1972,

Having taken into account the report of the Executive Director entitled "The environment in 1982: retrospect and prospect", 1/

Reaffirming its commitment to the implementation of the Action Plan for the Human Environment adopted by the Stockholm Conference,

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1/ UNEP/GC(SSC)/2 and Corr.1 (Russian only) and Corr.2

Na.82-0602

NOTE: Changes introduced by the U.S. are underlined.

Convinced that the principles of the Declaration of the United Nations Conference on the Human Environment are as valid today as they were in 1972, and, together with the principles adopted in Nairobi at the session of a special character, provide basic guidance for effective and sustained environment progress.

I

The major achievements of the Action Plan for the Human Environment

1. Concludes that the past decade has seen:

(a) Increased awareness among Governments and the public of the implications of environmental change, and acceptance that environmental protection consists not only of pollution abatement, but also of the rational use of natural resources for sustainable development;

(b) Provision for the environment in many national constitutions and administrative structures, creation of new environmental programmes at regional and international levels, and the extension and intensification of existing ones;

(c) Increased co-operation and collaboration among and between Governments and international organizations on environmental assessment and management;

(d) Efforts to protect the environment slowed down somewhat towards the end of the decade because of financial difficulties experienced by some countries;

(e) A worsening of environmental problems in developing countries arising from the present international economic order which has slowed down their development and the protection of their environment;

2. Considers that the sector-by-sector review of the implementation of the Action Plan suggests a mixed record of achievement. An over-all assessment is that fair-to-good progress has been made in implementing some of the elements of the Action Plan, while in respect of other elements the record has been very modest;

3. Further considers that major achievements and failures in the implementation of the Action Plan appear to be:

(a) In the area of environmental assessment:

(i) The Global Environmental Monitoring System is operating and expanding, although important gaps in the development, co-ordination, user applications and integration of the system components persist;

(ii) The Global Atmospheric Research Programme has continued and international studies of climatic change and variability and of the applications of climate knowledge to human activity have been incorporated in the World Climate Programme;

(iii) The International Referral System for sources of environmental information is functioning (as INFOTERRA) but has not adequately realized its objectives in particular because the growth of user demand has been slow;

(iv) The International Register of Potentially Toxic Chemicals has started to prove itself as an important centre for information on toxic chemicals;

(v) The International Programme on Chemical Safety is providing toxicological assessments for an increasing number of substances, together with accelerated manpower development, guidelines for emergency response to chemical accidents and technical co-operation relating to control of toxic chemicals;

(vi) Assessments of the environmental impacts of various sources of energy have been published;

(vii) A major report entitled "The World Environment 1972-1982" has been published in conjunction with the session of a special character;

(b) In the area of environmental management:

(i) There has been progress in the formulation of regional environmental programmes and Governments have concluded a number of important global and regional agreements as well as drawn up principles and guidelines, although in some cases there have been delays in their implementation or observance;

(ii) Worldwide efforts have expanded to combat desertification, to improve water supply and management, and to improve human settlements, although progress to implement the comprehensive United Nations action plans developed in each of these areas has remained slow;

(iii) Progress has been made in the implementation of international scientific programmes relating to the human environment, particularly the Programme on Man and the Biosphere and the International Hydrological Programme;

(iv) The World Conservation Strategy, which places particular emphasis on the problem of deforestation and extinction of plant and animal species, is being used by an increasing number of Governments as a basis for national conservation programmes;

(v) There has been progress in conceptualizing the objectives of environmental management and in developing some of its tools, such as environmental impact assessment, cost-benefit analysis and cost-effectiveness analysis;

(vi) The need to take into account environmental considerations in the evaluation of development projects has been widely recognized;

(vii) Although progress has been made through the International Whaling Commission in reducing whale catch quotas, the call for a 10-year moratorium on commercial whaling has not been given effect;

(viii) The Regional Seas Programme, which covers environmental assessment, environmental management, environmental law and supporting measures, including aspects of technical assistance and training, has been implemented with a satisfactory measure of success. Sufficient resources, continued planning and sustained commitment by Governments and international organizations are, however, necessary to maintain and extend the Programme;

(ix) Industry has had a number of achievements in reducing its adverse effects on the environment but still needs to strive and be encouraged to assume fully a role commensurate with its capabilities. Environmental controls in industrial development, including measures for the improvement of the working environment, are still very weak in a large number of countries;

(x) The industry and environment programme of the United Nations system has identified the environmental impacts of a number of specific industries, and guidelines formulated to deal with them are being tested and applied, training programmes have been provided, and a supportive information service established and put into operation;

(xi) The draft principles of conduct in the field of the environment for the guidance of States in the conservation and harmonious utilization of natural resources shared by two or more States, which were the subject of United Nations General Assembly resolution 34/186 of 18 December 1979, have not been widely used by Governments;

(xii) Inadequacies persist in redressing environmental problems of poverty and underdevelopment;

(c) In the area of supporting measures:

(i) Progress has been made by Governments and international organizations in encouraging environmental education, particularly following the Intergovernmental Conference on Environmental Education (Tbilisi, 1977). In the field of training, however, significant deficiencies persist. However, there has been insufficient attention to environmental education, particularly at university and intermediate levels, as well as to training of workers, technicians and managers and to public education;

(ii) Programmes of technical co-operation at the international level have increasingly included environmental components;

(iii) World Environment Day (5 June) is now observed by almost all countries. The various member organizations of the United Nations system participate actively in a wide information programme catalyzed by the Joint United Nations Information Committee. Despite the progress, however, the information programme is still inadequate and does not take sufficient account of regional needs;

(iv) UNEP and other organizations in the United Nations system have published many technical and general reports relevant to the environment. Coverage of environmental issues by the world media has expanded, particularly at the national level. Non-governmental organizations have made major contributions to increasing public awareness and knowledge of environmental issues. Continuation of these efforts remains important;

(v) Despite extensive aid through bilateral and multilateral channels to assist with development programmes, it is recognized that the priorities of developing countries for dealing with their serious environmental problems still do not receive adequate attention;

(d) In the area of institutional and financial arrangements for international environmental co-operation:

The Governing Council of the United Nations Environment Programme, the environment secretariat and the Environment Fund were established, and procedures for efficient co-ordination of environmental programmes in the United Nations system came into effect;

II

New perceptions of environmental issues

4. Considers that the following new perceptions which evolved during the past decade are generally accepted and, together with the Nairobi (declaration), complement the principles contained in the Declaration of the United Nations Conference on the Human Environment:

(a) Issues of disarmament and security in so far as they relate to the environment, because UNEP's role is to promote environmentally sound development in harmony with peace and security, need to receive attention. ~~/In line with General Assembly resolution 35/8 of 30 October 1980 and 36/7 of 27 October 1981 and UNEP Governing Council decision 9/4 of 25 May 1981/;~~ ~~/In line with relevant General Assembly resolutions/~~

(b) Wise use of resources and enlightened conservation strategies are consistent with the economic growth imperative and should be considered prerequisites for sustainable growth;

(c) Imaginative research into alternative consumption patterns, technological styles and land-use strategies, and the institutional, economic, juridical and educational framework to sustain them, are called for;

(d) The important interconnections between the components and processes which support the life of the planet should be taken seriously into account in development plans. Actions which benefit one area may cause unforeseen damage in others, and the possibility of such consequences should be considered at the planning stage;

(e) Because of the great space and time variability in environmental processes and the fallibility of models of technological and social change, environmental development and management should be planned in a flexible fashion. Unexpected changes should be detected at an early stage through continuous monitoring;

(f) Development plans should take account of the "outer limits" to the stability of environmental systems;

(g) Developments in the transfer of certain inappropriate technologies; export of toxic substances and hazardous materials and certain marketing arrangements, such as the patenting of seeds, can pose serious risks to the environment ~~and~~ which need to be arrested;

(h) The United Nations system, involving especially the catalytic role of UNEP, must address environmental problems of poverty and underdevelopment, particularly in the framework of the efforts being undertaken to establish the new international economic order;

III

Major environmental trends, potential problems and priorities for action for the United Nations system, co-ordinated by the United Nations Environment Programme during the period 1982-1992

5. Considers that the United Nations system must be alert to and retain the necessary programme flexibility for addressing major environmental trends and problems which may emerge or become more pronounced during the coming decade.

6. The trends, problems and priorities for action which should receive attention by the United Nations system, and specifically through the system-wide programme activities co-ordinated by UNEP are listed below:

(a) Atmosphere

Trends and problems: Continued decline in urban air quality in developing countries, long-range transport of air pollution, including SO_2 and NO_x emissions that give rise to acid rains, continued increase of CO_2, other trace gases and particulates in the atmosphere, possible depletion of stratospheric ozone, possible effects of human activities on weather and climate, extreme meteorological events such as tropical cyclones, floods and droughts;

Priority for action: Integrated monitoring of atmospheric pollutants and their effects, development and promotion of appropriate global, regional and national programmes; guidelines or conventions to respond to those problems; improvement of early-warning indicators for extreme meteorological events; understanding of factors affecting climate, including ocean-atmosphere interactions;

(b) Oceans

Trends and problems: Increasing pollution of the seas with oil and other substances from land-based sources, through the atmosphere and from ships; pollution of estuaries and coastal waters; overfishing; environmentally inappropriate exploitation of marine and coastal resources, despite expansion of mariculture and protected areas;

Priority for action: Development and application of methods for monitoring, assessing and preventing: (i) pollution of the oceans, including oil pollution; (ii) degradation of natural resources including mangrove and coral areas; development of new and strengthening of existing programmes and conventions for the environmental protection of regional seas; further development of plans and procedures for the management of marine resources; further development of mariculture and the establishment of marine protected areas; and support for disaster mitigation;

(c) Water

Trends and problems: Depletion and deterioration of surface water and ground water with increasing demand for drinking, agriculture and industry, and rising pollution in most countries; continued acidification and eutrophication of fresh waters; environmental problems created by water development projects; inadequate water basin management; transboundary water pollution, and continued technical */ difficulties in management of surface waters and ground waters shared by two or more States;

Priority for action: Assistance in the implementation of the objectives of the International Drinking Water Supply and Sanitation Decade, and in the promotion of guidelines for environmentally sound water management, including transboundary pollution and related environmental aspects; management of inland fisheries and aquaculture; promotion of techniques for rational water management including water basin management, pollution control, recycling of domestic and industrial waste water and flood control, prevention of water waste; promotion of assessment of environmental impact of hydrological schemes;

(d) Lithosphere

Trends and problems: Environmental impacts resulting from increased mineral extraction, especially by surface mining and quarrying, and from mining of coal, tar sands and oil shales, and disposal of waste; environmental hazards caused by earthquakes, volcanic eruptions, tidal waves and landslides;

Priority for action: Encouragement of technology for economic use of minerals including recycling, further development of methods of environmental impact assessment of mineral resource extraction; further development and promotion of improved methods for rehabilitation of land following mineral extraction, and satisfactory disposal or reutilization of wastes generated by human activities; further development of early-warning systems for volcanic eruptions, earthquakes and tidal waves;

(e) Terrestrial biota and bioproductive systems

Trends and problems: Mounting world food demand only partially satisfied because of inadequacies of production and distribution; continued severe soil degradation and desertification as a result of inappropriate agricultural practices, erosion, and deforestation; loss of agricultural land as a result of urbanization, adverse impacts on land and water resources from increasing land-use conflicts between agricultural production, fuelwood and other energy crops, protected areas and human settlements; adverse effects of slash-and-burn agriculture or other inappropriate agricultural practices; loss of potentially valuable genetic resources, including wild flora and fauna, as a result of deforestation and use and commercialization of endangered species; adverse impacts of improper or increased use of fertilizers and pesticides; depletion of wetlands;

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*/ One delegation proposed the addition of "and other" before "difficulties" and reserved its position regarding the wording accepted.

Priority for action: Monitoring and assessment of land conditions and capability in developing countries; monitoring and assessment of tropical ecosystems including changes in forest cover; formulation and promotion of programme activities for sustainable management of soils, tropical forests, genetic resources and for combating desertification; development of environmentally sound farming and forestry practices, including agroforestry, integrated pest-management and proper use of fertilizers; prevention of post-harvest food losses; reutilization of agricultural and agro-industrial residues; development of appropriate international procedures and instruments for handling and use of and international trade in pesticides; promotion of implementation of national and regional plans of action following the World Conservation Strategy and the designation of biosphere reserves; promotion of planning of urban development taking into account the needs of agricultural development and conservation of natural resources;

(f) Population and human settlements

Trends and problems: Continued growth of human population despite some decline in the rate of world population increase; high rate of urbanization that outstrips the capacity of Governments to provide essential services; growth of slums; disruption of rural communities and major inadequacies in rural services; environmental degradation due to the distortion of traditional patterns of pastoral nomadism;

Priority for action: Research into the interrelationship between population growth and the environment; development and promotion of application of guidelines for environmentally sound planning or rural and urban settlements, including provision of services and infrastructure; improvement of methods for safe disposal and re-use of urban wastes;

(g) Health

Trends and problems: Continued massive prevalence of infectious and parasitic diseases, malnutrition, inadequate safe water supplies, and lack of sanitation and food safety in developing countries; increased resistance of pathogens or their intermediary agents to chemical control; increase in disease incidence associated with development schemes; increasing number and prevalence of potentially toxic chemicals and residual micro-pollutants in the living and working environments; illnesses related to life-styles and the working environment; continued danger from trade in hazardous substances and inadequacies in their safe disposal;

Priority for action: Development of environmental health measures, including methods for the environmental control of disease vectors and parasites, and for improvement of sanitation in settlements, and improvement of hygiene, especially in developing countries; continued monitoring, notably in GEMS, and preparation of procedures, principles and guidelines within the International Programme of Chemical Safety; development and promotion of the application of procedures, principles and guidelines for safe trade and transport of hazardous substances and disposal of hazardous wastes; follow-up to list of dangerous substances and processes being prepared by UNEP;

(h) Energy

Trends and problems: Environmental impacts of continued increase in demand for fuelwood, expanding nuclear energy programmes and wastes generated in the production of energy; increasing use of coal; positive and negative aspects of intensified development and use of new and renewable sources of energy, and increase in energy plantations; some success in the development of energy conservation programmes;

Priority for action: Support for reafforestation policies in developing countries including encouragement of the use of fast-growing species; promotion of improved energy efficiency and conservation methods; development and promotion of guidelines for environmentally sound development of new and renewable sources of energy, and nuclear energy; promotion of global strategies for energy conservation and diversification;

(i) Industry and other economic development

Trends and problems: Continuing risks of serious pollution and natural resource degradation from inappropriate industrial development and existing industries, despite some progress in the development of low and non-waste technology and of improved systems of pollution control; inefficiency in the use of natural resources and energy in industry and other programmes of economic development. Inadequate environmental consideration in the siting and technologies of industrial and other economic activities, and in international trade and investments;

Priority for action: Development and promotion of guidelines for assessment of environmental impacts of industrial and other economic development (planning, siting, construction and operational control), for the improvement of the human environment and for the rational use of natural resources with special emphasis on the development of non-waste and low-waste technologies; preparation of principles or guidelines for environmental management of industry, handling (including storage) and disposal of toxic and dangerous wastes; and for minimization of water pollution resulting from industry; promotion of integration of environmental considerations in the development process; evolution of principles, guidelines or codes of conduct for promotion of environmentally sound practices in international trade and investments; improvement in the access to technical achievements which are of practical promise for the management of the environment.

(j) Peace, security and the environment

Trends and problems: Continuing increase in the production, stockpiling and risk of use of weapons of mass destruction and the development of new types of chemical and bacteriological weapons not only pose a major threat to the environment and even to life on earth, but also compete for limited resources that could be better used for constructive purposes;

Priority for action: In support of the continuing efforts in the United Nations General Assembly, and especially in its special session on Disarmament and the Disarmament Committee, to ensure that the environmental implications of existing and new types of armaments and warfare are taken into account;

IV

Basic orientation of the United Nations Environment Programme for 1982-1992

7. Considers that, on the basis of the new perceptions described in section II, UNEP, which is the global environmental organization at Government level, in keeping with its mandate and with the support of organizations of the United Nations system, should focus its attention on three major areas and should:

(a) Stimulate, co-ordinate and catalyze monitoring and assessment of environmental problems of world-wide concern and initiate and co-ordinate international co-operation in dealing with such problems;

(b) Promote, co-ordinate and implement appropriate policies and programmes for rational resource and environmental management as an integral part of economic and social development with particular attention to the needs of developing countries;

(c) Promote, co-ordinate and direct activities in the fields of information, education, training and national institution-building especially for developing countries, as well as the further development of environmental law and guidelines and methodologies of environmental management and where supplementary funds are available, assist in the implementation of these activities;

8. Further considers that with these three over-all basic orientations in mind, UNEP's objectives should be:

(a) In the area of environmental assessment:

(i) To improve early warning indicators of significant environmental changes;

(ii) To improve the planning and co-ordination of monitoring at the global and regional levels;

(iii) To produce concrete assessment statements for important environmental problems and their human health, social and economic implications;

(iv) To establish better links between the Global Environmental Monitoring System, the International Referral System for sources of environmental information (INFOTERRA), the International Register of Potentially Toxic Chemicals and national and international data centres;

(v) To promote the establishment of reliable global, regional and national environmental statistics and the state of the environment reporting as a basis for evaluating major trends and deciding any necessary action;

(b) In the area of environmental management:

(i) To promote environmentally sound patterns of development and to participate in the implementation of the International Development Strategy for the Third United Nations Development Decade;

(ii) To strive for the improvement of cost/benefit and cost/effectiveness evaluation of environmental measures, environmental assessment of development activities and integrated physical planning for rational use of natural resources;

(iii) To promote the adoption and implementation by States of legal and other appropriate mechanisms for assessing the effects on the environment of potentially harmful activities under their jurisdiction and control, as well as the dissemination of information and the public use thereof;

(iv) To promote the development of more cost-effective solutions to environmental management problems, in particular such solutions adapted to the needs of developing countries;

(v) To develop guidelines for environmentally sound development planning;

(vi) To promote and continue to contribute to the activities of the United Nations system in the area of the interrelationships among population, resources, environment and development;

(c) In the area of supporting measures:

(i) To strengthen the existing arrangements within UNEP and between it and the United Nations Development Programme and other organizations of the United Nations system with a view to enhancing the capacity of developing countries to deal with their environmental problems and concerns, including methodologies of sound environmental management, as part of their sustainable economic and social development;

(ii) To promote and facilitate the strengthening, within countries, of institutional arrangements for effective assessment of environmental impact of development and environmental management;

(iii) To promote, co-ordinate and catalyze, in co-operation with relevant institutions at the United Nations system, activities in the area of environmental education and training and public awareness with particular emphasis on:

- a Application of new education methods and better teacher training programmes through research and institution-building and the integration of an environmental component into school curricula; to seek to improve the quality of education and training, through making adaptations to existing facilities;

- b Increased training of specialists in various fields of environmental activities;

- c Better dissemination of information to the media, the general public and scientific audiences;

- d Integration of an environmental component in the training of enterprise managers, technicians, skilled workers and decision-makers concerned with environmental and resource management;

(iv) To encourage national and regional arrangements for the provision of information on crucial and emerging environmental issues, for example on the use of technology and products condemned in the country of origin;

(v) To support Governments and non-governmental and youth organizations in their efforts to increase environmental awareness and to encourage Governments to provide for strong public participation in the planning and implementation of environmental activities;

(vi) To encourage and facilitate the development of legal instruments relating to the environment at the national and international levels and to monitor their implementation; and, within its mandate, to promote the development of further guidelines, principles or agreements and to facilitate their application in areas of global and regional environmental concern in co-operation with the responsible international organizations;

(vii) To encourage the further examination of economic measures, such as pricing policies, incentives and pollutant and effluent charges which may be applied to complement environmental regulations;

9. In pursuing the above-mentioned objectives, UNEP should be guided by the major environmental trends, potential problems and priorities for action identified in section III, and should concentrate in particular on: promotion of land and water management, including control of desertification and deforestation; protection of natural resources; promotion of the International Drinking Water and Sanitation Decade; promotion of new and renewable sources of energy; promotion of regional seas programmes; prevention of environmental disturbances from air pollution; promotion of chemical safety and control of hazardous substances.

V

Planning and implementation of environmental activities

10. Solemnly urges Governments:

(a) To establish or strengthen national mechanisms for proper and timely identification and assessment of changes in the environment, including the national components of Earthwatch, especially their monitoring stations and their focal points for the International Referral System;

(b) To establish or strengthen national mechanisms for the integration of environmental considerations into development planning;

(c) To fit management techniques to environmental circumstances in dealing with sectoral problems;

11. Invites all Governments, integovernmental organizations and non-governmental organizations to ensure that the basic orientation identified in paragraph   above are accorded high priority within their respective programmes;

12. Requests the Executive Director by means of close co-operation within and outside the United Nations system to ensure, in the planning and implementation of environmental activities, that:

(a) The basic orientations identified in the Action Plan, and in particular, the objectives contained in paragraph   above, with special emphasis on the needs of the developing countries, serve as primary guides and are accorded high priority;

(b) Such planning and implementation be responsive to regional and sub-regional needs and national conditions and capabilities;

(c) These activities are concrete, have fixed priorities, are realistic and within a realistic time-frame, where possible undertaken collaboratively, implemented within an administratively simple framework and with adequate technical and financial support;

13. Also invites the governing bodies of the relevant organizations of the United Nations system to integrate the major environmental trends over the next ten years effectively in their action plans, and, on the basis of those trends, in close co-operation with UNEP, to draw up appropriate measures for environmental protection with due regard to available resources;

14. Requests the administrative heads of the relevant organizations of the United Nations system to intensify their co-operation with the Executive Director in the effective implementation of approved programmes in the field of the environment for the next ten years;

15. Requests the Executive Director to intensify co-operation with integovernmental organizations outside the United Nations system and non-governmental organizations and, as appropriate, support their work, and to invite such organizations to intensify their efforts in the field of the environment;

16. Urges all donors to respond positively and increase their assistance in accordance with established procedures and with the priorities of developing countries, to help meet their technical and financial requirements particularly in their efforts aimed at evolving national programmes of research and development, technology, institutional approaches and machineries for dealing with environmental problems.

VI

Institutional arrangements for the United Nations Environment Programme

17. Considers that the institutional arrangements for international co-operation in the field of the environment - the Governing Council, the secretariat, the co-ordination process within the United Nations system through the Administrative Committee on Co-ordination and the Environment Fund - are, generally speaking, adequate and appropriate;

18. Encourages Governments to keep under close and continuing review the functioning of these institutional arrangements and the implementation of the environmental activities of the organizations of the United Nations system with a view to improved co-ordination, programme strengthening and greater over-all effectiveness and efficiency in their application of financial and manpower resources;

19. Considers that the catalytic, co-ordinating and stimulating role of the United Nations Environment Programme remains appropriate and will require the continuing attention of the Governing Council in the light of section IV, paragraph 7 (c), bearing in mind the responsibilities of other bodies of the United Nations system;

20. Invites the Governing Council, at its regular session, to:

(a) Give over-all policy guidance on global, contemporary and emerging issues;

(b) Set priorities for the implementation of the programmes approved by it and assure that funds are made available in accordance with these priorities;

(c) Address itself more to governing bodies of other organizations of the United Nations system dealing with various environmental issues;

21. Requests the Executive Director, in preparing the system-wide medium-term environment programme in harmony with the procedures agreed by the Committee for Programme and Co-ordination, to emphasize the process of thematic joint programming, to intensify his consultations with various organizations of the United Nations system in the further development of the programme, and to ensure that the relationships between the secretariat of the United Nations Environment Programme and its co-operating agencies and supporting organizations continue to be positive and constructive;

22. Stresses the important present and future role of the Environment Fund;

23. Stresses further that, in view of the basic orientations identified in paragraph above, renewed efforts are necessary, and therefore:

(a) Strongly appeals to Governments to ensure that their contributions are in line with those objectives and basic orientations;

(b) Requests the Executive Director to continue his campaign to broaden participation in, and secure a higher level of contribution to the Fund, and seek other modalities of funding, and to continue his consultations with the Secretary-General to ensure application of the rationale for the distribution of the costs of the programme between the regular budget of the United Nations and the Environment Fund;

(c) Further requests the Executive Director to develop and put into effect mechanisms to ensure that budgetary measures are more responsive to regional, sub-regional and national needs.

APPENDIX 29

[From Smithsonian Magazine, August 1982]

Secretary Ripley's comments

The view from the castle

In the ten years between Stockholm and Nairobi, more developing nations have seen the need for environmental monitoring

Ten years ago I had the honor of attending as a member of the U.S. delegation the first United Nations Conference on the Human Environment in Stockholm. I wrote hopefully about the experience (SMITHSONIAN, August 1972), although as an ecologist and biologist by profession I was dismayed by the unfamiliarity of many delegates with the principles of ecology itself. Despite that, ecology had already become a fashionable word, used with confident authority by economists, politicians, lawyers and others whose principal outdoor experiences, as I said, tended to be "confined to crabgrass, the golf course or a day at the beach."

Now in 1982 there is an official United Nations Environment Programme (UNEP), headquartered in Nairobi, Kenya. The United States this year contributed $7.85 million to the program, although there is a possibility the amount may go down next year. Some 100 nations have just attended a meeting in Nairobi to mark the tenth anniversary of Stockholm, and to assess progress and plan for the future of the fragile envelope within which we live.

In 1972 many of the developing nations seemed to feel that concern for the environment was a subtle "imperialist plot." For instance, by limiting trade in goods and services that might be pollution producers, the industrialized nations could maintain an economic advantage over emerging countries. I recall the prime minister of a Third World nation saying to me, "Give us your smog. We want to eat it to make us rich!"

Now at this latest conference in Nairobi it was evident that many developing nations are well aware of the need for control and long-range restraint on simple exploitation. Brazil was a prime example ten years ago of resistance to calls for conservation. But by the mid-1970s Brazil had established an environmental office within the Interior Ministry. Paulo Nogueira Neto, chief of this division, has just been given, along with Maria Tereza Jorge Padua, the World Wildlife Fund's respected annual conservation prize, the $50,000 J. Paul Getty award.

Still, there is a persistent feeling in our country that not only is "all right with the world," but that mankind has made it so. As the Hudson Institute (1982) recently put it, "The idea that progress is normal has been prevalent since the beginning of the Industrial Revolution." The concept that technology will always rescue us from the consequences of our own skills and inventiveness is pervasive. Human ills today are largely a result of a simple mathematical process, the geometrical progression of human population growth. Ecologically speaking, this will be exceedingly difficult to arrest. Here, perhaps, there are answers in technology, but they will be spiritually trying indeed, and perhaps totally unacceptable to many.

Our own government leaders would be wise to keep up the relatively inexpensive funding of UNEP, not only as "an ounce of prevention" but also as part of a ground swell of public opinion which it would be a mistake to ignore. Where ten years ago we might have been thought of as having imperialist designs on the poorer nations by preaching conservation, now we would be one of the "good guys" if we pushed it.

S. Dillon Ripley